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BULGING BUBBLE?

Columnist Paul A. Strassmann: Increasing capital investments in IT could have a dire effect on the U.S. economy. Page 41

FRIENDLY FIRE

Our Security Manager Journal author launches an attack on his company to test his staff. Page 54

SOUPED-UP SEARCH

New search tools zoom beyond keywords and Boolean queries. Page 58

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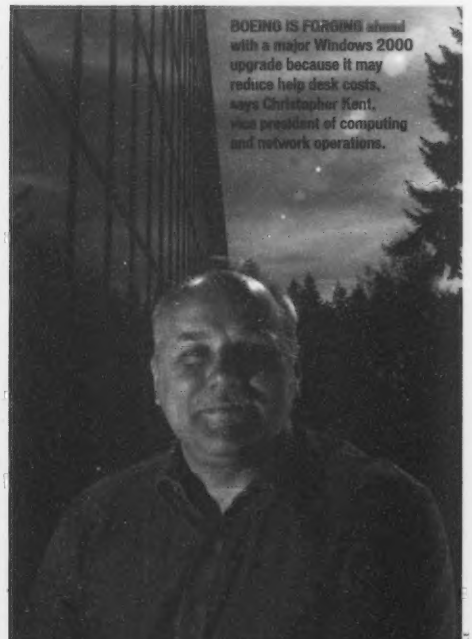

BRIAN SMALE

SURVIVING A DOWNTURN

- **TIPS FROM VETERAN CIOs** on steps you can take to recession-proof your IT department.
- **HOW TO PROTECT YOUR IT STAFF** — and your own career — by honing your client-management skills and aligning projects with the business side.
- **THE COST-CUTTING** and revenue-boosting technologies, such as moving to a paperless environment, to bet on during tough times.

Special Report begins on page 27.

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CONFIDENCE IN B2B SINKS TO MAJOR LOW

Vendor shortfalls show dearth of customers, but investors vow to keep exchanges alive

BY MICHAEL MEEHAN

Executives from General Motors Corp. and Delta Air Lines Inc. last week vowed to funnel purchases through their infant online exchanges despite prophecies from others that such businesses won't survive.

Already-waning confidence in the online exchange business model reached a low last week when many of the vendors whose software allows participation in such exchanges announced a precipitous drop in their revenues.

At a conference in New York last week, Martin Ryu, vice president for corporate strategy at Mountain View, Calif.-based Ariba Inc., went so far as to predict the demise of all public exchanges. He said industry competitors haven't been able to agree on marketplace business models and that shuttling data among a slew of a disparate corporate architectures is a feat beyond the reach of modern technology.

Ariba took one of the biggest hits among business-to-business software vendors: Its quarterly revenue was almost halved, forcing it to announce plans to lay off a third of its workforce.

Some executives have even begun speaking about public exchanges in the past tense, believing they are too new to survive in a slumping economy.

"I think it was a great idea, and if [the exchanges] had enough time, they might have

Exchanges, page 73

MOBILE NETWORKS HIT SPEED BUMPS

3G wireless speeds fail to match claims

BY BOB BREWIN

Don't count on actually obtaining the maximum advertised speed from much-ballyhooed advanced mobile wireless networks when they're rolled out later this year.

That's the message from large enterprise wireless users, network equipment providers, analysts and the carriers themselves. Carriers acknowledged last week that the average throughput on third-generation mobile wireless networks will be in the range of only one-third to one-half of the peak speeds they hyped in announcements at the recent annual Cellular Telecommunications & Internet Association

Speed, page 16

Nokia phones won't work on 3G networks

BY BOB BREWIN

Nokia Corp. may have to recall millions of cell phones due to a software glitch that renders them inoperable with third-generation networks that major U.S. carriers plan to start using this year.

The company maintains that it can resolve the problem with a software patch in the network infrastructure, which would avoid a recall. But major carriers and an industry working group want to carefully evaluate the fix to ensure that it doesn't delay the network rollout or generate other compatibility problems.

Espoo, Finland-based Nokia said the problem, which it dis-

Nokia, page 16

WIRELESS DISCONNECT

PROGRAMMING GETS EXTREME

Development method takes off, but not in U.S.

BY LEE COPELAND GLADWIN
OXFORD, ENGLAND

An application development technique called eXtreme Programming is gaining momentum among mainstream corporations in the U.K., though it's been slower to pick up converts in the U.S.

The approach, developed by programmer Kent Beck, calls for pairing developers together, performing automated unit testing and editing code frequently to keep it simple. In the U.S., it has met resistance from firms that see doubling up programmers as increasing cost.

But British attendees at the Object Technology 2001 conference here last week said the technique helps them tackle development challenges ranging from projects that come in over budget and behind schedule to those that require reams of documentation on the code's structure.

Dresdner Kleinwort Wasserstein, for example, is using eXtreme Programming methods in some of its application development projects, said Tom Ayerst, an architectural

Extreme, page 14

Microsoft Project 2000

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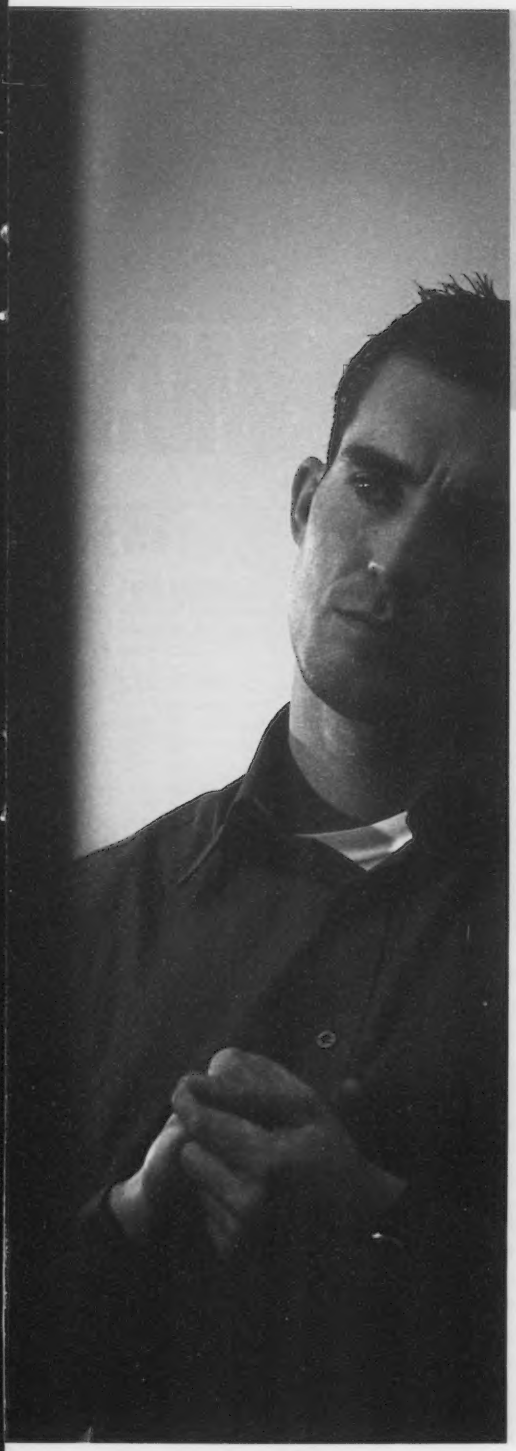

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JOHN HARRINGTON

QUIQ TO MARKET

Start-up Quiq, headed by Kartik Ramakrishnan, Greg Richardson and Raghu Ramakrishnan, offers a hosted customer relationship management service that extends a company's knowledge base to external partners and experts for customer support.
Page 60

JENNIE ZEHNER

WIRELESS WORKER WOES

Companies can't get enough wireless programmers, according to recruiters like Charles Moore. And the demand is pushing salaries sky high.
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6 **CYBERCRIME** is best fought by IT departments that work with their organizations' legal staffs, say computer crime experts.

7 **AETNA'S NEW CIO** faces significant IT challenges as the struggling health insurer continues to battle financial woes, say analysts.

7 **CISCO INTRODUCES** a VPN device designed to make network administration easier.

8 **MANY FEDERAL AGENCY** computers are riddled with security weaknesses, officials tell Congress.

8 **SECURITY PROJECTS** are escaping the IT budget pinch, but they're getting closer scrutiny than in the past.

10 **FULLY COLLABORATIVE** supply-chain technology has yet to be developed, but many companies claim it will transform the way they do business.

12 **GOP LAWMAKERS** are sniping at new health care privacy regulations, but health care IT groups are urging quick implementation.

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50 **INTERNET CRIME** is on the rise, and *Computerworld*'s security expert says you should think like a crook to keep your organization from becoming a victim.

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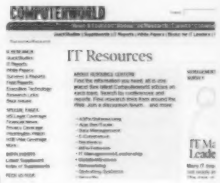
56 **FLUORESCENT** multilayer discs promise huge amounts of storage capacity in small packages, some the size of a credit card.

58 **SOUPED-UP** search tools take users far beyond keywords and Boolean queries.

ONLINE

Find the IT information you need, all in one place! Check out *Computerworld*'s new **Resource Centers**. From application service providers to the wireless market, you can read the latest news stories and analysis, search for conferences and reports, find useful links from around the Web and join our discussion forums. *www.computerworld.com/cwi/itresources*



Our **Autopsy of a Dot-Com** panel steps back to look at how the dot-com implosion has affected the economy as a whole — and what the world may look like once the plunge is over. *www.computerworld.com/ecommerce*

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25 **THORNTON MAY** writes that corporations should take the lid off what their executives know and don't know.

46 **JOE AUER** offers companies this advice: Make sure any consultant you hire doesn't quickly undertake a similar project for your competitors.

74 **FRANK HAYES** suggests that IT should embrace end users' use of some IT tools, in the name of better IT/business alignment.

AT DEADLINE

AOL Chat Knocked Out

America Online Inc.'s widely used AOL Instant Messenger (AIM) chat service was hit by two outages last week. AIM was inaccessible for part of Thursday, an incident Dulles, Va.-based company blamed on a power failure in northern Virginia. Last Tuesday, AOL said an unspecified hardware problem temporarily knocked users off the service.

Intel Probed in Europe

The European Commission disclosed that it's investigating Intel Corp. for possible antitrust violations after receiving a pair of complaints about the microprocessor maker's marketing and licensing tactics. In a statement, Intel said its executives believe its business practices "are both fair and lawful."

Microsoft Reacts to Passport Criticism

Microsoft Corp. quickly rewrote its Passport password service's terms of use last week after customers and privacy advocates complained that the document appeared to give the company ownership of user content. Revised terms indicate Microsoft will own only customer communications exchanged with the company itself. Microsoft plans to use its Passport service as a component of other upcoming Web-based services.

Corrections

In the Premier 100 IT Leaders for 2001 supplement [CW, March 26], honoree Donald A. Zacherl should have been listed as chief technology officer at the National Association of Home Builders (*www.nahb.com*). Also, the Web address for Delta Technology Inc. should have been listed as *www.deltadt.com*, and the correct Web address for Capital One Financial Corp. is *www.capitalone.com*.

In an interview on page 36 in the April 2 issue, Frank Carpenito should have been identified as the president and chief operating officer of RetailExchange.com Inc.

Layoffs Hit IT Staff On Wall Street

With trading down and automation beefed up, financial firms look to cut costs

BY MARIA TROMBLY

ECONOMIC DOWNTURN

IN PREVIOUS bear markets, brokers and administrative employees have typically been the first to get laid off by brokerages looking to cut costs.

But now that so many firms have met their goals of increasing bandwidth to provide clients with more online trading and advisory services, IT workers are starting to feel some of the pain.

For instance, New York-based industry stalwart Merrill Lynch & Co. last week announced plans to cut 109 jobs, including 80 IT positions in its London office. Meanwhile, Ameritrade Holding Corp. in Omaha confirmed last week that it will pare 170 customer service jobs on top of the 300 it eliminated in January.

A few days earlier, San Francisco-based Charles Schwab & Co. announced that it would slash up to 3,400 jobs before the end of the second quarter. In addition, reports have surfaced that Morgan Stanley Dean Witter & Co., The Bear, Stearns Cos. and Citigroup Inc. subsidiary Salomon Smith Barney Holdings Inc. are also considering plans to trim their head counts.

"Due to the continuing weak business environment affecting our industry, we continue to examine how to allocate resources, including staff and other expenses," said Merrill Lynch spokesman Joe Cohen.

Investing Changes

That means brokerages will no longer invest as much in network and storage capacity.

"Last year was about building the pipes in order to handle increased trading volume," said Richard Repetto, an analyst at Putnam Lovell Securities Inc. in New York. "Now the pipe is plenty big enough."

Brokerages are also beginning to invest in technologies aimed at helping them cut costs in other areas, such as call centers, Repetto said.

That's what's happening at Ameritrade, said Tim Butler, an analyst at Portland, Ore.-based Pacific Crest Securities Inc. Butler said Ameritrade recently introduced some internal efficiencies, such as real-time quotes, that mitigate the need for customers to call and ask for current stock prices.

"That has allowed [Ameritrade's] call volumes to fall down a little and allowed the company to get by with fewer employees," said Butler.

The automation hasn't hurt customer service, company officials claimed.

"Approximately 70% of inbound callers use our interactive voice response system," an Ameritrade spokesman said. He added that the company spent $100 million last year on technology, though he declined to say whether the current rounds of cost-cutting would have any impact on Ameritrade's IT budget this year.

Although Ameritrade and Charles Schwab rely heavily on electronic trading for their revenues, traditional brokers are also looking to trim their costs.

"Our business units around the world have been asked to review current head counts and expenses, in light of current market conditions," said Morgan Stanley spokeswoman Judy Hitchen.

Hitchen declined to comment on whether and to what extent Morgan Stanley's IT staff would be affected.

IT Urged to Work With Legal Departments

Forum: Counsel can help battle intruders

BY PATRICK THIBODEAU
WASHINGTON

IT departments that try to battle computer crime independently may be undercutting their companies' ability to fight off intruders.

What's needed is a team approach, especially one that involves a corporate legal department that understands the investigative process and can assist law enforcement. That was the assessment of a panel of experts, including some current and former top U.S. computer crime investigators, at a public policy forum held last week. The forum was sponsored by The Bureau of National Affairs Inc., a news and information service in Washington.

When security problems arise at many companies, legal counsel is often left out of the loop, said Christopher Painter, deputy chief of the computer crime section at the U.S. Department of Justice. "System operators don't think about that; that's not their first concern," he said.

But corporate legal departments can make all the difference in an investigation, said Christopher Bubb, the former New Jersey deputy attorney general who investigated the 1999 Melissa virus. Bubb recently left his post to become a legal counsel at Dulles, Va.-based America Online Inc.

AOL played an instrumental role in identifying the originator of the Melissa virus. When the company's legal department contacted state computer crime officials in New Jersey, where the suspect resided, it "did so in a manner that gave law enforcement what they needed in an investigation," Bubb said.

Bubb said there's a "free flow of information" between the information security department and the legal staff at AOL. "We are allowed to be involved in the decision-making on the front end," he said.

J.P. Morgan Chase & Co. in New York has dedicated teams around the globe for managing information security, said Jacinthia Lawson, a risk management officer at the company. Moreover, she said, J.P. Morgan has incident response teams that include senior managers; a fraud division; the human resources department, in case an employee is involved; auditors if there's a breakdown in controls; and legal and corporate staff.

Many companies, however, remain reluctant to involve law enforcement in computer crime investigations for fear that the publicity will hurt their firms. Shawn Henry, who heads the computer intrusion unit at the Washington-based National Infrastructure Protection Center, said he has more than 1,200 pending investigations, and 99% of the cases remain under wraps.

Companies that concentrate on remediation — closing off a vulnerability to deter an attacker — without any investigative follow-up may be hurting themselves in the long run. That's especially the case if companies are dealing with an attack by a disgruntled employee or competitor, said Scott Charney, a partner at New York-based PricewaterhouseCoopers.

Best Practice?

Would the ability of IT departments to battle computer crime improve if corporate legal staffs were involved?

Computer crime experts say yes, particularly if the company is considering contacting law enforcement authorities. **Legal staff with an understanding of investigative techniques can help prepare a case for law enforcers,** potentially speeding the investigation.

New Aetna CIO Faces Tough Challenges

Management shake-up continues as exec inherits e-business, consolidation issues

BY JULEKHA DASH

Aetna Inc.'s new CIO will likely face significant challenges as the struggling health insurer tries to overcome its financial woes and develop a sound business strategy, analysts said.

Last week, the Hartford, Conn.-based firm announced a new vice president and CIO, Wei-Tih Cheng, who was most recently vice president of information systems at the Memorial Sloan-Kettering Cancer Center in New York.

Cheng, who was once an IT executive at IBM, will replace Aetna CIO John Brighton, who has held the post for the past three years. (Although a 1999 press release states that Brighton was CIO at Aetna, Aetna spokesman Alfred LaBerge insists that Brighton was head of IT and Cheng was brought on as CIO. LaBerge said Brighton continues to work with the company.)

Among Cheng's top IT challenges is consolidating a potpourri of claims-processing platforms that Aetna has inherited through a series of acquisitions, noted Doug Johnston, an analyst at Cambridge, Mass.-based Forrester Research Inc.

"It's a common problem for HMOs that grew quickly [during the late 1990s]" to be struggling with too many IT systems, said Melissa Gannon, a vice president at Weiss Ratings Inc., a Palm Beach Gardens, Fla.-based investment ratings agency.

Other health insurance companies, such as Trumbull, Conn.-based Oxford Health Plans Inc. and Brookline, Mass.-based Harvard Pilgrim Health Care Inc., have experienced similar growing pains, said Gannon. "Part of what's going on now [among HMOs] is a streamlining of their management information systems," she said.

Laberge said Cheng comes to Aetna in the midst of a "radical transformation" at the company.

Management shuffles at Aetna in recent months include the appointment of Ronald A. Williams, previously an executive at WellPoint Health Networks Inc., as executive vice president and chief of health operations. William C. Popik, who was most recently senior vice president and national medical director at Cigna HealthCare, was named Aetna's chief medical officer.

These appointments came after John W. Rowe, Aetna's chairman and CEO, was brought in as president and CEO of Aetna's U.S. Healthcare division in September. Rowe was formerly president and CEO of Mount Sinai NYU Health in New York.

Tough Times

Aetna has had a tough financial run. For the fourth quarter ended Dec. 30, the company posted a $406 million loss, stemming primarily from a restructuring charge related to the sale of its financial services and international businesses to Dutch insurer ING Groep NV.

As more consumers demand online health services, Aetna will likely look to Cheng to solidify its online health strategy so consumers will be able to check the status of their claims online, said Johnston.

WEI-TIH CHENG: Top priority is to solidify an online health strategy.

Fred Bang, director of systems development at Memorial Sloan-Kettering, described Cheng as someone who is "open-minded" about solving technology problems. At the cancer center, Cheng led an effort to install a fiber-optic backbone that gave the hospital the ability to handle client/server applications such as electronic medical records and picture archival systems.

However, it remains to be seen whether Cheng's IT savvy will help rescue the insurance company.

Even the most skilled technologist can't save a company that doesn't have a sound business strategy, said Mark Anderson, a vice president at Boston-based Meta Group Inc. and a former hospital CIO. "The challenge for a CIO is getting consensus [among] executives," Anderson said.

Users Say New Cisco VPN Device Cuts Network Costs

$1,000 box makes remote connections easier, cheaper

BY JAMES COPE
LAS VEGAS

While network administrators grapple with the complexities of managing the remote-user end of virtual private network (VPN) connections, pilot users of a new hardware product from Cisco Systems Inc. claim they have found a way to ease the effort and even lower the cost.

JOHN METTEY: The 3002 connects for $59 per month, compared to $200 for frame relay.

The new product, the Cisco VPN 3002 Hardware Client, was unveiled last week at Cisco's Global Partner Summit here.

The device, which the company said is now available, connects to a cable or Digital Subscriber Line (DSL) modem at a remote office and communicates over the Internet through an encrypted tunnel linked to a Cisco VPN concentrator device at the user's corporate data center.

The 3002 has VPN logic built in, including support for the IPSec protocol for encryption and authentication over the Internet. It's a single hardware box that's an alternative to software VPNs installed on PCs at remote sites, Cisco officials said.

John Mettey, a network administrator at TriHealth Inc., has been testing the 3002 to link physicians' offices to the Cincinnati-based health care group's data network that includes the Good Samaritan Hospital and the Bethesda North Hospital.

TriHealth's remote users had previously been connected over frame relay. Although that option is secure, Mettey said, the service through a local telephone provider is costly: $200 per month for each of the almost 100 physicians' offices connected.

"The 3002 lets us plug in a box and run data over the public Internet using DSL or cable at a cost of $59 per month, per office," Mettey said. And the devices can be centrally monitored and managed, which he said eliminates the need to send technicians to physicians' offices to troubleshoot software-based VPNs or to set up new network policies.

Centralized management of the VPN devices was what convinced Elliot Zeltzer to test the product. Zeltzer is manager of telecommunications and data services at Gedas Inc. in Auburn Hills, Mich. Gedas is a systems integrator that's dedicated to providing data communications for Volkswagen of America Inc., also based in Auburn Hills.

Zeltzer said that during the next year or two, he'll be placing the Cisco VPN devices in approximately 950 VW offices and dealerships throughout the U.S. and Canada. He said it would permit LAN-to-LAN connections and replace a variety of remote connections being used, including some satellite links.

Joel Conover, a senior analyst at Giga Information Group Inc. in Cambridge, Mass., said the VPN 3002 is consistent with Cisco's goal of creating VPN interoperability across a broad range of operating systems. According to Conover, while other manufacturers make hardware VPN clients, the Cisco unit is the first that allows users to configure VPN policies on such a device from a central location. He said that may be why Cisco is charging $995 for the device, which he considers "a little high."

Yet Bob Brace, vice president of product and channel marketing at Espoo, Finland-based Nokia Corp., said his company's CC 500, a $1,495 VPN hardware appliance, is similar in functionality to the Cisco device.

Brace said Nokia's higher price is a function of a patented clustering feature that permits stringing multiple CC 500s together to ensure that the VPN stays up even if one of the appliances fails.

Cisco Abandons Optical Router

Cisco disclosed last week that it will discontinue its ONS 15900 Wavelength Router, a product that routes network traffic by manipulating wavelengths of light. The technology was acquired through Cisco's purchase of Richardson, Texas-based Monterey Networks Inc. in 1999.

Explaining the decision, Carl Russo, Cisco's vice president of optical networking, said service providers weren't willing to deploy the technology as quickly as Cisco had anticipated. Russo attributed the soft market for the product to a slowdown in capital spending by service providers.

A source at Cisco said that WorldCom Inc. and Fairfax, Va.-based metropolitan-area-network provider Cambrian Communications LLC had purchased the ONS 15900.

Worldcom officials weren't immediately available for comment. Doug Butler, chief financial officer at Cambrian, downplayed the Cisco move.

"Their decision won't affect our network deployment, and our relationship with Cisco remains solid," Butler said. He declined to say whether his company would continue to use the ONS 15900.

– *James Cope*

Federal Systems Increasingly Falling Prey to Hackers

Officials testify before Congress about risks of root-privilege compromises

BY PATRICK THIBODEAU
WASHINGTON

HACKERS are becoming more and more successful in gaining root-privilege control of government computer systems containing sensitive information, said federal officials who testified last week before a U.S. House subcommittee. The officials said computers at many agencies are riddled with security weaknesses and that little is being done to change that.

When an attacker gets root privileges to a server, he essentially has the power to do anything a systems administrator could do, from copying files to installing software such as sniffer programs that can monitor the activities of end users. And intruders are increasingly doing just that, the officials told the House Subcommittee on Oversight and Investigation.

"The increase in the number of root compromises, denial-of-service attacks, network reconnaissance activities, destructive viruses and malicious code, coupled with the advances in attack sophistication, pose a measurable threat to government systems," said Sallie McDonald, an assistant commissioner at the General Services Administration (GSA).

Last year, 155 systems at 32 federal agencies suffered root compromises in which intruders took full administrative control of the machines, according to the GSA. That's up from 64 root compromises in 1998 and 110 two years ago. And the government has only a vague idea of what kinds of data may have fallen into unauthorized hands.

For at least five of the root compromises, officials were able to verify that access had been obtained to sensitive information, McDonald testified. But for the remaining 150 incidents, she added, "compromise of any or all information must be assumed." She characterized the compromised data as involving scientific and environmental studies but said she couldn't elaborate.

Meanwhile, in a report released last week summarizing security audits that have been completed at 24 federal agencies, the General Accounting Office (GAO) said it had identified significant security weaknesses at each one. Robert Dacey, director of information security issues at the GAO, said in his testimony that the shortcomings have "placed an enormous amount of highly sensitive data ... at risk of inappropriate disclosure."

The government is going to find itself in "deep, deep trouble" if its IT security procedures aren't improved, warned Rep. Billy Tauzin (R-La.), chairman of the House Committee on Energy and Commerce. If sensitive personal data about U.S. citizens is compromised, "Americans are going to wake up angrier than you can possibly imagine," he said.

Many of the thousands of attempts to illegally gain access to federal systems come from abroad, testified Ronald Dick, who took over as the director of the FBI's National Infrastructure Protection Center cyberdefense agency last month. "We know many nations are developing information warfare capabilities as well as adapting [cybercrime] tools," he said.

Hackers are also exchanging vulnerability information with one another, said Tom Noonan, president and CEO of Internet Security Systems Inc. in Atlanta. "There is a whole new currency on the Internet that's called the back door," he said, adding that attackers are trading information about back doors that provide access to different systems.

One step the government could take to strengthen the security of its systems is to focus more resources on improving education and training, Noonan said. "Computer security experts are scarce," he added. "They are in short supply, and they are expensive."

A 1998 directive by President Clinton ordered all federal agencies to complete a virtual bulletproofing of their IT systems by May 2003. But officials said most agencies are behind in that work and that only a few are doing penetration testing.

Code Red

Computer security breakins of federal systems are increasing. The most significant problem is root compromises, in which an intruder gains total system privileges.

1999	
Significant viruses:	35
Root compromises:	110
Total incidents:	580
2000	
Significant viruses:	36
Root compromises:	155
Total incidents:	586

SOURCE: FEDERAL COMPUTER INCIDENT RESPONSE CENTER

Security Likely to Escape Spending Cuts

Hackers, Net business efforts drive projects

BY JAIKUMAR VIJAYAN

It's going to be easier to get money for security projects than for most other technology initiatives at a time when firms are cutting overall IT spending, users and analysts said.

But there's going to be growing pressure on managers to demonstrate measurable returns on investment when justifying new security projects, they said on the eve of this week's RSA Conference 2001 trade show in San Francisco.

AT A GLANCE

Cut-Resistant

Security is likely to weather budget cuts better than other IT areas because:

- Increased hacker and virus attacks have heightened concerns about enterprise security.
- The cost of a single security breach can be enormous, in terms of monetary damage and corporate credibility.
- Building secure business-to-business networks means having technologies for user authentication access control.

"Security will withstand the slowdown better than most [other IT areas]," said Sean Jackson, a financial analyst at Suntrust Equitable Securities Corp. in Nashville. "Hacker attacks are on the rise, and more companies are relying on the IT infrastructure for their core operations."

He added, "While many organizations in the past year have overinvested in equipment such as PCs, routers and servers, they have underinvested in the security of their IT infrastructure and are just now playing catch-up."

There are other reasons as well. Take TRW Inc., the $17 billion manufacturing giant in Cleveland. Despite a modest slowdown in other areas of IT spending, the company is going full speed ahead with a major project to deploy a digital certificate network for authenticating employees and business partners who log on to the company's network, said CIO Mostafa Mehrabani.

"As companies grow to be more collaborative in dealing with customers and suppliers, the role of information security becomes even more critical from the context of authentication and access control," he said.

The key, though, is to show business value when launching such security projects and to constantly look for ways to cut costs not just in security, but in other areas as well, Mehrabani added.

For example, TRW is consolidating several of its data centers, reducing the number of service providers it outsources to and standardizing technologies wherever possible to cut costs, he said.

"If there [were] a way to cut costs without compromising security or service, I would do so," said Josh Turiel, network manager at Holyoke Mutual Insurance Co. in Salem, Mass.

Instead, the company is likely to spend almost double what it did last year beefing up enterprise security, Turiel said. At the same time, Holyoke will spend less on workstations and desktop technologies this year because it purchases these products on a three-year life cycle, he said.

"I would rather spend more on security, because the cost of a single breach is a heck of a lot more than all the money I can throw at the problem," Turiel said.

"We are not cutting IT budgets because of the slowdown," echoed Rob McGhie, a member of the IT security and policy team at Raytheon Corp.'s facility in Garland, Texas.

"All the projects here must demonstrate a measurable ROI at any time. However, as a defense contractor, security here is not treated as an affordable or nonaffordable luxury but as a requirement," he added.

The results of a survey of 150 CIOs last December by New York-based Morgan Stanley Dean Witter & Co. showed that corporate IT budgets are expected to increase by just 8% on average this year, compared with an average budget increase of 12% last year. And 16% of the respondents said their IT investments would decrease this year.

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BRIEFS

KBkids Tries B2B

Denver-based KBkids.com Inc., the Web arm of Pittsfield, Mass.-based K-B Toys, has launched a site geared to the wholesale business-to-business toys market. The site, KBwholesale.com, specializes in closeout and collectible toys in wholesale "case packs" at discounted prices. While the site, search engine and shopping cart technology are separate from those of KBkids.com, the sites share designers, technical infrastructure, platform, warehouse space and customer service. That enabled K-B Toys to launch the initiative on a shoestring, the firm said.

Microsoft Licenses Speech Technology

Microsoft Corp. has licensed speech-recognition technology from Boston-based SpeechWorks International Inc., the two companies said last week. Microsoft hasn't specified the products or services it plans to use with the Speechify text-to-speech technology. Speechify allows text-based information such as e-mail to be read to telephone callers automatically. It can also be used in speech-activated systems for conducting transactions by phone. America Online Inc. and Yahoo Inc. have each licensed the technology for use in their phone portals.

Privacy Bills Targeted

U.S. House Speaker J. Dennis Hastert (R-Ill.) is urging Congress not to pass any privacy laws regulating the private sector until the government "cleans up its own systems" and can safeguard the personal information it holds.

In a speech last week in Chicago, Hastert said it's industry's job to take the lead on privacy matters.

FTC Eyes Collusion

The Federal Trade Commission (FTC) will examine competition issues raised by business-to-business e-commerce at a workshop May 7 and 8. Among the issues to be examined are what information-sharing practices may facilitate collusion and what safeguards should be erected to prevent it.

Is E-Collaboration IT's Friend or Foe?

Speakers cite it as a path to future but note challenges of technology, security

BY MICHAEL MEEHAN
NEW YORK

Collaborative commerce has been touted at conferences lately as the cure for the inefficiencies of the business world. Yet executives seem to be split on whether it's the wave of the future or a quick path to ruin.

At last week's E-business Battle Royale conference, General Motors Corp. CEO G. Richard Wagoner Jr. identified the ability to quickly build a car to a customer's specifications as the Holy Grail for his industry. He added that collaboration is the only way to achieve that.

FEDEX'S ROBERT CARTER: "You have to be prepared for everything."

"We need it to help tighten what's a very long automotive supply chain," Wagoner said. "We can take all the orders in the world, but we still have to build the cars."

Yet, others fear that sharing too much information with partners will cost them their competitive advantage.

Joseph Magliochetti, chairman, president and CEO of Toledo, Ohio-based vehicle parts maker Dana Corp., said his company has made some delivery and production information available to its automotive partners. But Magliochetti said he's wary of transmitting more sensitive information, such as data on prototype car parts that won't be available for five years.

"There's a tremendous hesitancy to what you do online ... and how secure that information is," he said.

Bruce Bond, an analyst at Stamford, Conn.-based Gartner Inc., told attendees at last week's Internet & E-Business Conference & Exposition here that the ability to share supply-chain information with business partners will lead to 20% faster revenue growth for companies by 2004.

But he also warned that companies aren't likely to see fast returns on investments in interoperable IT backbones.

"We don't have the technological standards to operate [collaboratively] on a global level," Bond said. There are some "kludgy ways to make this stuff interoperate," but software vendors have yet to provide users with universal supply-chain transparency out of the box, he added.

In particular, Bond said he faulted enterprise resource planning applications for being "monolithic" and "not designed for sharing."

Robert Carter, CIO at Memphis-based FedEx Corp., agreed. "You have no idea when you're using the Web what technologies you're connecting to, so you have to be prepared for everything," Carter said

But vendors have mixed feelings about developing standards. "We have to have some kind of common standard we can rely on," said Wolfgang Kemna, CEO of SAP America Inc. in Newtown Square, Pa.

However, Jim Mackay, chief technology officer at Dallas-based i2 Technologies Inc., said standards would likely form only after enough businesses install collaborative technology.

Cautious Approach

Michelle DeRoo, director of e-commerce at Bloomingdale, Ill.-based computer reseller Comark Inc., voiced caution about spending major IT dollars on such an unsettled market. "There are some companies that are going to find they invested tons of money in the wrong technology," she said.

Carter, however, argued that businesses can't afford not to invest in more Internet-friendly collaborative networks.

"Those who ignore this will get hammered three or four years down the road," Carter said.

Although the technology still isn't available to open up entire supply chains to partners, businesses are creating personalized systems with individual suppliers.

FedEx, for instance, shares online maintenance and warranty documents with one of its major fleet suppliers, DaimlerChrysler AG.

Lockheed Martin Corp., BAE Systems Inc. and Northrop Grumman Corp. are using shared applications, common document management systems and collaborative online workspaces so their engineers can work together to compete for the U.S. government's Joint Strike Fighter contract [Page One, Feb. 5], according to Mark Peden, vice president of IT at Fort Worth, Texas-based Lockheed Martin Aeronautics Co.

"Quite frankly, using the technology of 10 years ago, we would not be able to do this," Peden said.

Web-Based Supply Chains Lose Steam as Economy Slows

Users rethinking their B2B strategies

BY MARC SONGINI

While interest in Web-based supply chains remains steady, attendees at the Supply Chain World conference in New Orleans last week said they're rethinking their business-to-business strategies due to the softening economy.

Frank Campagnoni, chief technology officer at General Electric Co.'s Global eXchange Services in Gaithersburg, Md., said too many companies believed that they could make money quickly by throwing up an e-business site without bothering with things such as connecting online storefronts to back-end systems.

But, he added, the slowing economy and continuing losses at B2B exchanges have sparked doubt about how to succeed at e-business.

Internet-based supply-chain applications can reduce procurement costs and improve collaboration between manufacturers and their suppliers, Campagnoni said.

"But ultimately, it's a lot of hard work, and you have to roll up your sleeves and work with partners," he said.

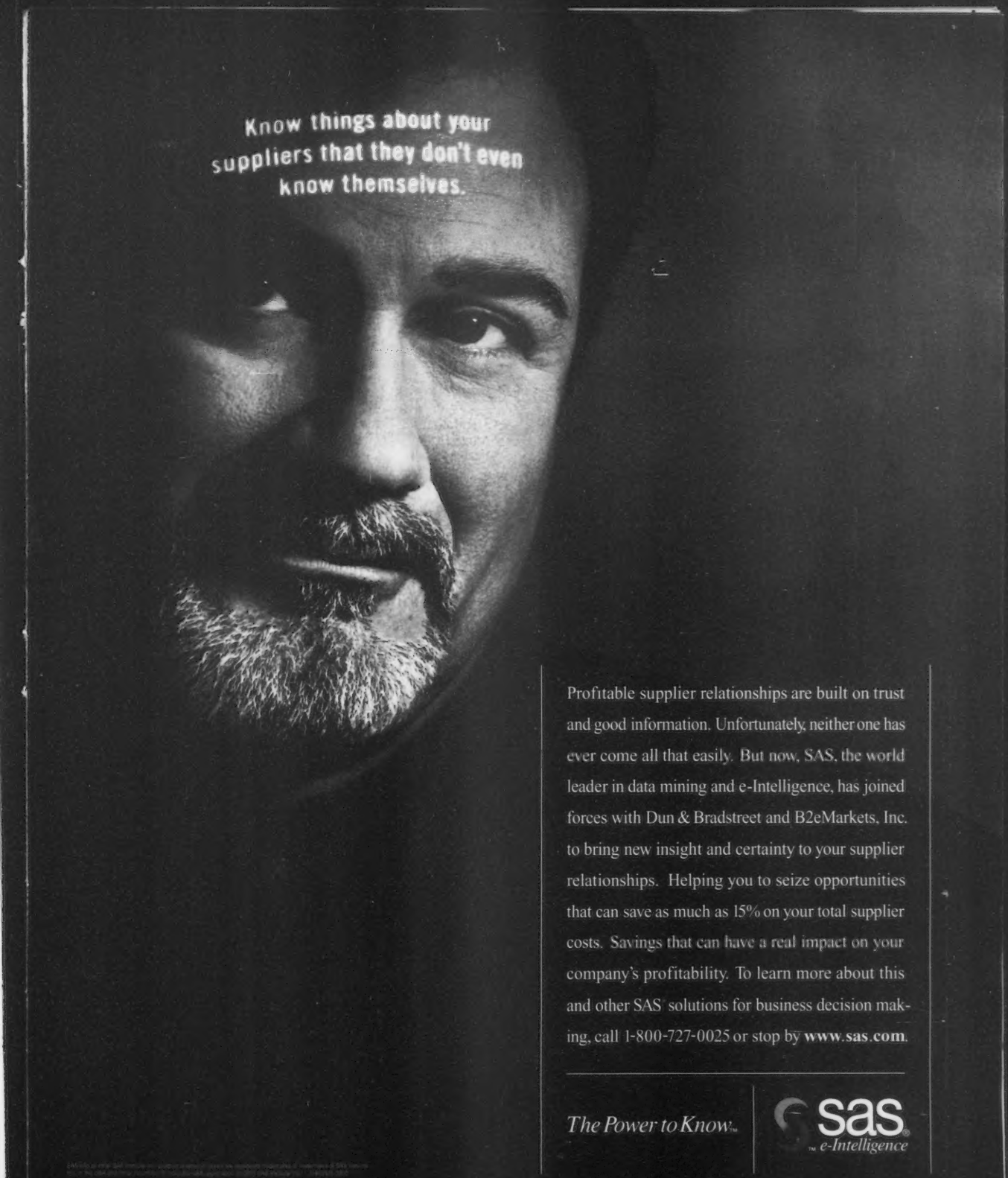
"The market is dazed and confused," said Jay Stephens, a consultant at Chicago-based Accenture, who spoke at the conference, which was sponsored by the Pittsburgh-based Supply Chain Council Inc.

Despite the proliferation of supply-chain tools, many companies have neglected to think about the real business value that they're likely to get by using the software, he said.

For example, too many users invested money in business-to-business marketplaces in response to peer pressure and still have nothing to show for their troubles.

Now, however, many companies "are skeptical," said Stephens. "They're saying, 'Show me the money.' "

> [E-business] is a lot of hard work. You have to roll up your sleeves and work with partners.
>
> FRANK CAMPAGNONI, CTO, GLOBAL EXCHANGE SERVICES



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Health Care IT Groups Fight for HIPAA Passage

But Republicans push for delay to allow for revisions as April 14 deadline looms

BY JULEKHA DASH

As Republican legislators continue to attack the Clinton administration's health data privacy rules, major health care IT groups last week urged the federal government to implement the Health Insurance Portability and Accountability Act (HIPAA) on April 14 as scheduled.

Without the final privacy rules, the health care industry can't move forward in automating transactions because the confidentiality of medical records would be at risk, said Soloman Appavu, co-chairman of the committee that helped establish the standards for processing claims and other tasks.

"These things work together," he said. "You can't implement HIPAA without privacy regulations."

In a letter sent last week, seven GOP senators urged U.S. Department of Health and Human Services (HHS) Secretary Tommy Thompson to delay HIPAA implementation until revisions can be made to reduce the legislation's costs and administrative burdens. But the 12,000-member Healthcare Information and Management Systems Society (HIMSS) fought back with its own letter to Thompson, arguing that uniform standards are badly needed to protect the confidentiality of personal health information.

"The bottom line is that Congress has been working on the issue of privacy and security for the past four years and [has] managed to enact nothing," said H. Stephen Lieber, president and CEO of the Chicago-based HIMSS. "I am not sure I understand the Republican argument."

A spokesman for HHS said that the department still has to wade through more than 10,000 public comments and that no final decisions on the privacy rules have been made. Lawmakers released the HIPAA regulations, which Congress passed in 1996, in several stages last year.

Meanwhile, those in health care remain divided. The industry will remain saddled with inefficiencies if the government prolongs the implementation of the HIPAA, said Appavu, who is also director of systems planning at Cook County Hospital in Chicago.

But Richard Diamond, a spokesman for House Majority Leader Dick Armey (R-Texas), who asked Thompson to delay the HIPAA's implementation, said the rule could actually hinder patient privacy. One of the regulation's "buried" provisions allows HHS to access medical records, he said.

"Whatever happens, we have to make sure we don't impose rules that result in less privacy," said Diamond.

If the rules go into effect April 14, health care groups will have two years to comply with them. ◗

Brian Sullivan and Patrick Thibodeau contributed to this report.

Patient Privacy Proponents

Health care IT groups that oppose delaying HIPAA:

- ►Healthcare Information and Management Systems Society
- ►The American Medical Informatics Association
- ►American Health Information Management Association
- ►Center for Healthcare Information Management

DSL Failure Leaves Customers Hanging

Some NorthPoint users wary of DSL

BY TODD R. WEISS

When bankrupt NorthPoint Communications Inc. shuttered its nationwide Digital Subscriber Line (DSL) service two weeks ago, the surprise overnight loss of the high-speed Internet access took its toll on thousands of business customers.

"We're scrambling to find another service provider, and it's going to cost a lot more money," said Mark Couley, the IT coordinator for the nonprofit Boston Ballet. The ballet received its DSL service for 85 users through a national Internet service provider, but the provider, like others around the nation, offered the service through Emeryville, Calif.-based NorthPoint.

Next month, Couley said, the ballet will have frame-relay service installed because he's worried about the recent troubled financial states of several other national DSL providers. "All kinds of DSL companies are going south, out of business, so we wanted something that would be reliable," he said.

Jim Kennedy, information systems manager at Brokaw Inc., an advertising agency in Cleveland, agreed, saying the NorthPoint episode soured him on DSL. "None of the remaining DSL providers are particularly healthy," he said. "I have no faith in those kinds of businesses surviving long term."

Kennedy noted that he had initially believed that NorthPoint would survive the bankruptcy proceedings it filed in January. "I had very little in the way of a backup plan because I didn't think that anything would happen," he said.

After the shutdown, Kennedy installed sets of 56K bit/sec. modems to be used until a faster service can be installed. Meanwhile, the low speed is a major problem for a business that continually sends and receives large graphics files via e-mail. "It's a nightmare," he said.

Customer Disconnect

A spokeswoman for AT&T Corp., which now owns NorthPoint's hardware and software, said that the company chose not to buy NorthPoint's customer base for business reasons and that it was NorthPoint's responsibility to help its customers find new service providers.

Last week, the California Public Utilities Commission, which regulates telecommunications in that state, barred NorthPoint from shutting off its service without giving customers 30 days' notice. But the service had already been shut down, leaving the matter unresolved.

NorthPoint's telephone has been disconnected; a notice on the company's Web site advises users to contact their Internet service providers.

Lisel Fay, managing editor of *France Today* magazine in San Francisco, said the NorthPoint shutdown hit her company on its monthly production day, stopping the publication in its tracks.

The staff was able to get back online only last week using a newly installed dial-up 56K bit/sec. modem that's being shared by 10 users. ◗

House Debates Uniform Privacy Law

BY PATRICK THIBODEAU
WASHINGTON

U.S. businesses face a patchwork of privacy laws, but that may be better than having to write a single, uniform law to handle all privacy concerns, a House subcommittee was told last week by a panel of privacy experts and some of its own members.

The House Subcommittee on Commerce, Trade and Consumer Protection, which has been examining the adequacy of privacy laws in the U.S., turned its attention to the 30 federal statutes and many more state rules covering the issue and asked the question, "Would businesses and consumers be better off with one comprehensive law?"

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The current assemblage of laws creates problems for some businesses, said Michael Lamb, chief privacy officer at AT&T Corp., in his testimony before the panel.

"The costs are substantial," said Lamb, who noted that in dealing with a customer using multiple services, such as wireless, cable and telephony, the company has to restrict its internal use of wireless data in one way and cable data in another way to meet various privacy rules.

"We have not heard consumers telling us that they want us to tie our hands internally to any great extent on what we do with their data, but in [meeting] compliance with these statutes, we have to do exactly that," Lamb said.

But he also acknowledged that a uniform law covering all industries would be difficult to develop, except for some "high-level principles," such as agreeing to disclose to consumers how their data is used.

U.S. privacy laws are aimed at regulated industries, principally in areas such as medicine, finance and telecommunications, and are typically developed in response to specific problems.

The Video Privacy Act, for example, was enacted to protect the confidentiality of people who rent videos. ◗

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BRIEFS

Sun Releases Patch

Sun Microsystems Inc. last week asked users of its SunBlade 1000 workstations to install a software patch to avoid possible data corruption caused by a problem on its new UltraSPARC III chips. The problem occurs only in rare circumstances when running certain floating-point operations, and it doesn't affect Sun's servers, the company said.

Business Method Patents Scrutinized

The practice of awarding patents for business methods, such as Seattle-based Amazon.com Inc.'s patent for one-click shopping, was scrutinized by a U.S. House subcommittee last week.

"Merely transferring a familiar or obvious process into a new communications medium shouldn't provide an 'inventor' with a 20-year monopoly on that procedure," said Andrew Steinberg, executive vice president at online travel agency Travelocity.com Inc. in Fort Worth, Texas.

But Nicholas Godici, acting director of the U.S. Patent and Trademark Office, said the courts have made it clear that business methods can be patented.

CSC Wins $200M Outsourcing Contract

St. Vincent Catholic Medical Centers in New York signed a seven-year, $200 million IT outsourcing contract with Computer Sciences Corp. (CSC) in El Segundo, Calif. CSC will manage St. Vincent's business and clinical information systems, including telecommunications, legacy software applications and 5,500 desktop computers. About 140 St. Vincent IT employees will transfer to CSC.

United Installs Kiosks

Chicago-based United Air Lines Inc. last week announced plans to install more than 1,100 self-service check-in kiosks at airports during the next two years. United isn't the first company to install kiosks, but this is the largest such deployment, said IBM, which is supplying the kiosks. The kiosks will be for use by passengers with electronic tickets.

Microsoft Backs Off Changes to VB.Net

Listens to developers, leaves some parts of second VB.Net beta same as VB 6.0

BY CAROL SLIWA

IN RESPONSE TO developer feedback, Microsoft Corp. has retreated from some changes to Visual Basic.Net.

Microsoft had planned to make the modifications to make Visual Basic (VB) consistent with other languages, such as C++, according to product manager Ari Bixhorn.

However, developers told Microsoft they would prefer to see those parts of Visual Basic.Net remain the same as they are in Visual Basic 6.0.

When Microsoft releases the second beta version of Visual Basic.Net, developers will find the following:

- The value of "true" won't be changed to 1 and instead will remain -1, as it is in VB 6.0.
- Planned VB.Net modifications to the words *and* and *or* will be scrapped. Microsoft had planned to change the behavior of the words to function only as logical operators, and it planned to add new operators for bitwise operations. Instead, the Boolean operators *and* and *or* will remain the same as they are in VB 6.0.
- Arrays, or collections of elements, will be declared by specifying the upper boundary, as they are in VB 6.0. For instance, an array numbered from 0 to 10 would carry the number 10. In VB.Net, Microsoft had planned to make a change so that the number of elements would be declared. As such, a 10-element array would have been numbered from 0 to 9.

Continued from page 1

Extreme

consultant at the London-based investment bank. He said he favors having two developers work together on the same project, which is one of the controversial aspects of the technique.

"It's like having a pilot to focus on flying, while the navigator makes strategic decisions about where to go next. In the end, you make fewer coding mistakes and stupid choices," Ayerst said.

Royal & Sun Alliance Insurance Group PLC has faced daunting application development dilemmas. Two years ago, the $16 billion London-based insurer launched a four-year custom development project to integrate data from its legacy systems with its call centers using conventional development techniques. But when Royal & Sun decided to add Web-based applications on top of that core application infrastructure, it did so using eXtreme programming (XP) methods, said Stephen Hutchinson, senior technical architect at Royal & Sun.

"We weren't 100% satisfied that we had done the previous project as good as it could have been done," Hutchinson said.

In its first XP project, Royal & Sun developed an application that connects to Britain's national motor vehicle registry, accepts electronic payments and provides online quotes. It took six months to build and was rolled out in July.

Pairing two developers on each assignment helped Royal & Sun experience productivity gains, develop more stable code and come in 15% lower than the projected budget, Hutchinson said.

XP is also gaining popularity at universities on this side of the pond. Courses about the technique have begun cropping up in computer science curricula in the U.K.

"It's gaining ground with a big evangelical thrust," said David Dench, senior lecturer at the University of Huddersfield in Huddersfield, England. "The requirements for applications are changing rapidly. ... XP reflects that because it emphasizes small projects" that can be changed more easily.

In the U.S., some of XP's more radical features, such as the requirement of immediate feedback from an on-site internal end user advocate, may make it more difficult to implement. "Nobody has scaled up XP to make it successful in large organizations," said Mary Lynn Manns, professor at the University of North Carolina at Asheville.

"I would never try XP back in the U.S. with my development teams," said Eoin Woods, senior system architect at InterTrust Technologies Corp. He cited a prevalence of distributed development teams as one impediment to getting an XP project off the ground at his Santa Clara, Calif.-based publishing software firm.

Larry Zucker, executive director of application development at Dollar Rent A Car Systems in Tulsa, Okla., said he appreciates the benefits of having two programmers on one task, but added that the gains don't justify the doubled expense. "We don't tend to have two people working together on the same code," said Zucker. "I would be afraid that the programming would turn into a social event."

Yet a London start-up found the opposite to be true. Connextra Ltd., a maker of Web browser software, reorganized its offices to accommodate XP, installing curved desks that let two developers sit side by side and share a computer.

"It's easy to get distracted when you're coding by yourself. You're not as disciplined," said Tim MacKinnon, a senior developer. "With pair programming, it's like having your conscience sitting next to you."

XP Fundamentals

EXtreme Programming was developed primarily by Kent Beck, who led the project to rewrite Chrysler Corp.'s payroll application. Some of XP's core principles include:

- An emphasis on **simply written object-oriented code**
- **Pair programming** — two programmers working side-by-side developing code
- Automated unit tests that are **written beforehand** and run throughout the project
- **Frequent editing** to remove unneeded functionality

New Worm Targets Linux Systems

Adore hunts down unprotected boxes

BY KIM S. NASH

Security analysts warned last week that another worm is hunting the Internet for Linux systems left unprotected against several well-publicized vulnerabilities, including one commonly found in Version 7.0 of Durham, N.C.-based Red Hat Inc.'s Linux release.

Known as Adore, it's the third worm found to be targeting Linux servers since January, following earlier ones called Ramen and Lion.

The newest worm is similar to Ramen and Lion in the way it acts, according to an advisory issued by the SANS Institute in Bethesda, Md. Adore creates back doors in computers that use the open-source Linux software, then transmits configuration data and other identifying information about the compromised systems to four e-mail addresses.

At risk, SANS said, are Linux systems that haven't been protected against vulnerabilities known as rpc-statd, wu-ftpd and LPRng and a vulnerability in the Berkeley Internet Name Domain software. All of those vulnerabilities are well-known and can be blocked by readily available patches.

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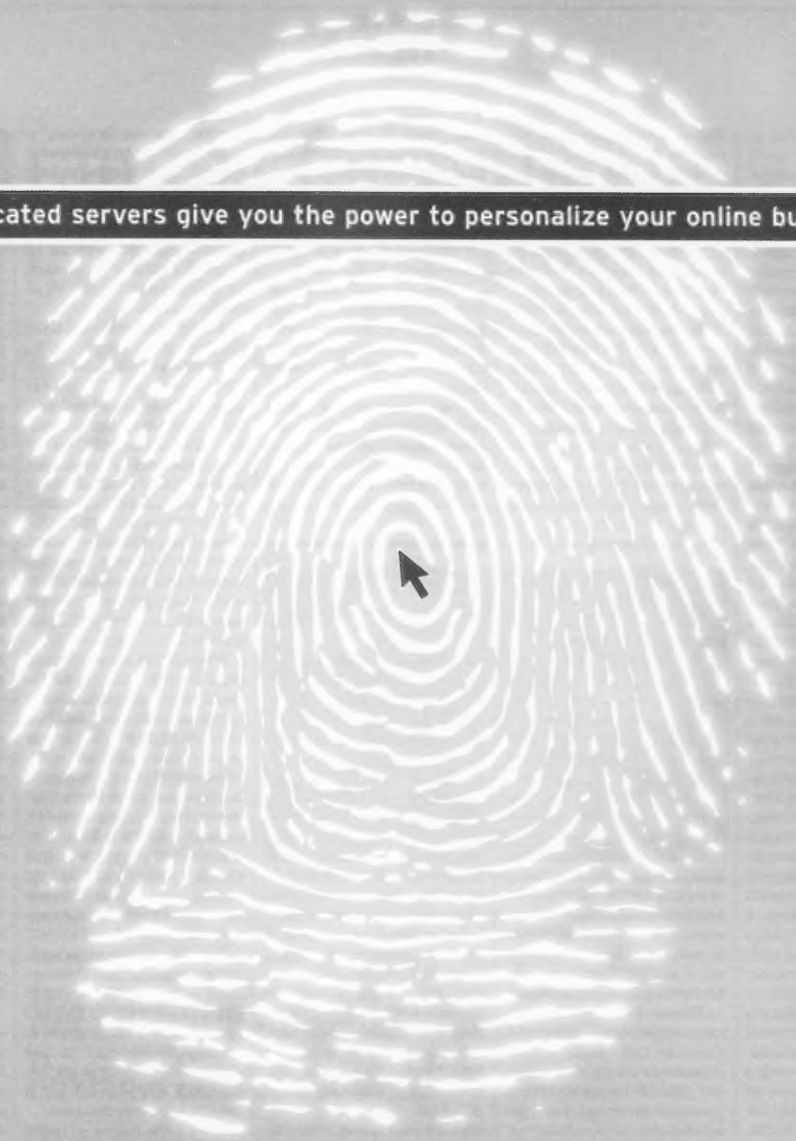

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Continued from page 1

Nokia

covered last week, stems from the approach it took in developing its second-generation phones operating on the Code Division Multiple Access protocol. That approach makes the cell phones inoperable with the 3G networks that carriers such as Sprint PCS Group in Kansas City, Mo., and Verizon Wireless plan to start deploying this year.

Ed Chao, senior manager in the wireless networks group at Murray Hill, N.J.-based Lucent Technologies Inc., said Nokia's problem is the result of a "software shortcut" the company took with the 2G CDMA standard. According to Chao, if Nokia had followed the 2G CDMA specifications, the older phones should have been able to access the new 3G networks for voice calls and data transfer at lower speeds. As it is, Nokia's older phones can't access 3G networks at all.

Megan Matthews, a spokeswoman for Nokia, acknowledged that due to the company's "interpretation" of the older 2G CDMA standard, its phones can't tap into the synchronization channel of the 3G CDMA networks, making it impossible for them to grab a signal. "The phones keep spinning but just won't register with the network," she said.

Matthews said Nokia is working with wireless network systems manufacturers — including Lucent — to develop a software patch that can be loaded into base stations, allowing its older Model 2100, 5100 and 6100 phones to tap into the 3G networks. "We believe a software-based solution is best for the industry," she said. "It would eliminate the recall of millions of phones."

Andrea Linsky, a spokeswoman for Verizon Wireless in Bedminster, N.J., said her company "is working with Nokia to make sure customers' handsets can evolve" to the new 3G standards. She declined to say if Verizon would accept a software patch in lieu of a wholesale handset replacement.

Perry LaForge, executive director of the CDMA Development Group in Costa Mesa, Calif., said it will take the CDMA industry, including carriers, network systems providers and Nokia, at least 30 days to determine if the problem should be resolved with a handset replacement or a software fix to wireless base stations.

"[But] we don't want any delay in the rollout of 3G," LaForge said. "There is a tremendous amount of momentum to deploy this year, and we don't want any delay." He said a software patch "would benefit Nokia the most, but we have to be prudent and test the software [to ensure that] there are no downstream ramifications."

Chao said Lucent believes it has developed a software base station patch for Nokia phones that stays within the CDMA standards, won't be costly to carrier customers and can be rolled out quickly. But Lucent still needs to conduct tests of its fix, he added.

Bob Egan, an analyst at Gartner Inc. in Stamford, Conn., said Nokia's problems with CDMA aren't new. "Nokia has no clue on how to build network equipment or handsets for CDMA," he said. "They have failed miserably in the past, and this latest round is yet more evidence of their ineptness in realms beyond [Global System for Mobile Communications, the European standard]."

No Dial Tone

Nokia is trying to avoid recalling millions of handsets.

- Old phones can't synchronize with 3G networks
- Nokia says a software patch to network base stations will fix the problem.
- Industry wants a fix that won't delay the 3G rollout.

Continued from page 1

Speed

conference in Las Vegas.

Though the carriers had boasted raw speeds for 3G networks starting at 144K bit/sec. this year, with speeds reaching 2M to 3M bit/sec. in the 2004 time frame, Verizon Wireless in Bedminster, N.J., said that in tests, throughput averaged only 50K bit/sec. on its 144K bit/sec. service.

Verizon spokeswoman Andrea Linsky said that when the company rolls out a 2.4M bit/sec. service next year, speeds will average "500K bit/sec. in a mobile environment, and you'll only get 2.4M bit/sec. in a fixed environment."

These speeds are also application-dependent, Linsky said, meaning that when a user downloads a fat file, throughput should increase. "When you need the speed, you'll get it," she said.

Actual Speed

3G wireless speeds depend on several factors:

- **Distance from a cell tower,** the type of application and network load all affect speeds.
- **Users should expect** speeds of 50K to 70K bit/sec. on 144K bit/sec. networks; they can expect 500K to 600K bit/sec. speeds on 2.4M bit/sec. networks.
- **Only fixed,** not mobile, users can obtain 2.4M bit/sec. speeds.

Randy Roy, vice president of network systems at FedEx Corp. in Memphis, said wireless network users need to consider average speeds rather than "raw channel speeds."

Roy said he expects that the 144K bit/sec. networks will average 50K to 70K bit/sec. Although it's much slower than the peak speeds touted by the carriers, this range "is still significantly higher than the networks that exist today," he said. "Our private [wireless network] averages 9.6K [bit/sec.]."

The 144K bit/sec. peak speed cited by the carriers "is the speed of a single packet under optimum conditions," said Ken Dulaney, an analyst at Gartner Inc. in Stamford, Conn. "We expect most 3G technologies to provide somewhere between 28K bit/sec. and 64K bit/sec." But, he added, "because we are trying to match speeds obtained under the wired circuit-switched system to wireless packet, it's a very, very rough guess."

Tom Crook, director of technology research and development at Sprint PCS Group in Kansas City, Mo., said the tests his company has run show an average throughput "in the 60K to 70K bit/sec. range" on the 144K bit/sec. service it plans to introduce this year.

"That's the nature of [radio frequency] networks," Crook said. "The signal gets weaker the farther away you get from a cell tower." A user closer to the tower will obtain higher average speeds than a user at the edge of a cell site, he explained.

Sprint PCS plans to roll out a 2.4M bit/sec. service in 2003, and Crook said users should expect average speeds in the 600K bit/sec. range. "You'll have to be standing still to get the 2.4M bit/sec. speed," he said.

Ichiro Kawasaki, a spokesman for Lucent Technologies Inc. in Murray Hill, N.J., which has a $5 billion contract to supply Verizon with 3G gear, agreed with these assessments. Average throughput will run below peak speeds in a wireless environment "because it's a shared resource, just like an office LAN," Kawasaki said. "Speed is based on the number of people on the network, as well as how close you are to the cell site."

SAP, CA Announce Own Portal Applications

Web-based software can tie in other apps

BY TODD R. WEISS

Enterprise software vendors SAP AG and Computer Associates International Inc. last week joined the portal fray, laying out plans for personalized, all-encompassing applications aimed at simplifying access to business data and other information.

Both Web browser-based products promise increased productivity and the ability to tie together a wide range of desktop and other applications, including office suites, directly through their interfaces.

The portals, like those from other vendors (see chart), will allow users to customize the flow of information and content both from inside their companies and from online sources by setting their own desktop preferences.

SAP's portal package is being developed with Santa Clara, Calif.-based Yahoo Inc. through a new U.S.-based subsidiary.

No pricing has been released for the product, which is following SAP's pending acquisition of San Jose-based portal developer TopTier Software Inc.

Meanwhile, Islandia, N.Y.-based CA detailed the immediate release of an upgrade to its 6-month-old Jasmine ii Portal software. New features will also allow users to create multiple portal "workspaces," giving them custom portals for several simultaneous tasks. The upgraded application includes the use of an increased number of international languages.

Pricing will start at $15,000 per server for an unlimited number of users.

Harry Wolhandler, an analyst at ActivMedia Research LLC in Peterborough, N.H., said the products are part of a larger trend to make corporate information more accessible to employees.

Pervasive Portals

Other vendors in the burgeoning enterprise portal market include:

IBM Enterprise Information Portal 7.1
Oracle Corp. Oracle 9i Application Server and Fast Forward Enterprise Portal
PeopleSoft Inc. Customer, employee, supplier and enterprise portals
Sybase Inc.: Enterprise Portal 2.0
Verity Inc. Portal One

Tech Training for Inmates A Risky Undertaking

Prison IT managers find they can be exploited by the users they educate

BY MARK HALL
UMATILLA, ORE.

IT MANAGERS at Two Rivers Correctional Institution here last month celebrated their first anniversary of running one of the most technologically advanced medium-security prisons in the country. But giving prisoners access to PCs to conduct legal research and learn computing skills — even on nonnetworked machines — makes modern prisons a constant proving ground for IT security systems.

The adversarial relationship these facilities have with prisoners as IT users requires them to implement rigorous security policies and technologies, said Lloyd Thorpe, regional manager for the information systems and services division at the Oregon Department of Corrections (DOC).

"Here, you know that a lot of your users have nothing better to do than spend their days dreaming of ways to get you," he said.

For example, inmates in one of Two Rivers' 14 housing units figured out how to broadcast messages to their cohorts in other units. They discovered a flaw in the law library application they had access to via thin-client terminals that let them broadcast messages to other terminals via IP addresses. According to Thorpe, the prisoners immediately embarked on illegal activities related to gangs and contraband.

The episode came to a quick halt because correctional officers inside the housing units had been trained to recognize how the application should look and feel, even though they don't use it. When one of them noticed the broadcast text, he notified Thorpe's staff, who fixed the application.

"IT security is not just about technology. It's mostly about training people and keeping their sense of security heightened," Thorpe said.

Steve Morrison, education director at the National Corrections Law Enforcement Training Center in Moundsville, W.Va., agreed. "You can't depend on technology to cover your butt," he said.

However, Morrison said, there are some specific design steps IT managers in security-sensitive areas can follow, especially when it comes to a network cable plant, which should always be wall-mounted in metal conduits so it can't be tampered with.

Peripherals and applications need to be carefully guarded as well, said Peg Ritchie-Matsumoto, who spent the past five years as chief technology officer at the Ohio Department of Rehabilitation and Correction. She is now deputy director at the Border Research and Technology Center in San Diego, a research firm that targets corrections technology staff located on the Mexican and Canadian borders.

Ritchie-Matsumoto pointed to instances where prisoners were caught creating false release papers with software such as CorelDraw. "Inmates will manipulate technology for their own purposes," she warned.

Perhaps the most important security measure prisons can take with their wards is to let them access only stand-alone machines, Ritchie-Matsumoto said. And if the machines are on a network — like Two Rivers' shared-access network to its law library — keep it isolated, she added.

"Anything that touches an offender doesn't touch our network," said Clint Branum, manager of the IS unit at the Oregon DOC. The prisoners' LAN is isolated; in fact, it's a Token Ring network, while the staff's network is Ethernet-based.

But giving prisoners access to computers is a necessity, said Glenn Riley, assistant director at the Oregon DOC, where inmates are trained in areas such as computer-aided design and manufacturing, computer repair and HTML. But they never get access to the Internet.

"We're trying to prepare folks for the outside world," Riley said. "It makes no sense not to expose them to computers, because they're an important part of the real world."

Prison IT managers are always evaluating technologies to secure their IT systems, said Branum.

Two Rivers uses biometric palm readers, smart cards and other security apparatus. At a cost of less than $70 per biometric device, it's foolish not to use them everywhere possible, Morrison said.

But no matter how much IT security a prison installs, inmates will explore it and manipulate what they can.

"Remember 'Spy vs. Spy' in *Mad Magazine*?" asked John Taylor, a technical support analyst at the Two Rivers facility. "That's what it's like to work here sometimes. They constantly probe; we always defend."

THE HIGH-TECH TWO RIVERS Correctional Institution (foreground) sits along the banks of the Columbia River in north-central Oregon. IT managers there play cat-and-mouse with users to maintain security while training inmates for their release into the outside world.

Net Infrastructure a New Revenue Source for Builders

Developer cuts deals with communication service providers

BY JAMES COPE

When builders turn over the keys to buyers of new homes and office buildings, they generally count their money and move on to the next deal. But The Estridge Cos., a planned-community developer in Carmel, Ind., has discovered that prewiring planned communities for communications access services and sharing the subsequent revenue with the service provider may be a way to get continuing income after a sale.

Estridge has contracted with service provider FirstMile Technologies Inc. in Indianapolis to provide residents and businesses in its 500-home Centennial community in Westfield, Ind., with broadband Internet connections, telephone services, cable TV and security monitoring through a single pipe. Over the next 25 years, Estridge will receive a portion of FirstMile's service revenue from users who live in the Centennial development.

The shared-revenue concept is moving to other cities, too.

Last week, FirstMile and Nortel Networks Corp. in Brampton, Ontario, jointly announced a $30 million agreement under which Nortel will provide network and telecommunications equipment for FirstMile planned communities in Dallas, Denver and Tampa, Fla.

Mark Flagg, director of special projects at Estridge, declined to specify the percentage of FirstMile's service fees that Estridge will collect from Centennial residents. He noted, though, that over the life of an agreement with FirstMile, a developer stands to make between $3 million and $4 million per 1,000 homes.

"It's great for the builder, because this [income from services fees] is an ongoing revenue stream that didn't previously exist," Flagg said.

Communications connections are made to the homes in Centennial through standard coaxial cable, Flagg said. FirstMile provides the entire system and all of the services, which he said means users receive a single bill for telephone service, digital cable, broadband Internet access, security and video-on-demand. The average bill is about $180 per month, Flagg said.

In addition to communications access services, Flagg said, FirstMile provides a community intranet that connects Centennial residents with local businesses, schools and medical facilities.

The planned-community single service provider concept benefits both the developer and the service provider, said Emmy Johnson, an analyst at Synergy Research Group Inc. in Phoenix. The idea of wired communities isn't new, she said, but the revenue model for the builder is.

"It gives service providers a captive audience in a market that's fiercely competitive," said Johnson.

Flagg said Estridge would soon begin construction on another planned community in the Indianapolis area.

Quantum Leaps Into Enterprise Storage

BY LUCAS MEARIAN

After 22 years in the hard disk drive manufacturing business, Quantum Corp. last week announced that its stockholders had approved the sale of its hard drive division to Maxtor Corp. for $1.1 billion in stock.

The sale marks the start of a new course for Quantum, which confirmed its transformation into a pure-play enterprise storage provider.

During the past year, Quantum has cut about 1,000 employees from its U.S. operations — about one quarter of its workforce — in preparation for the hard drive business becoming part of Maxtor and the change in corporate direction, said Quantum Chairman and CEO Michael Brown. Both Quantum and Maxtor are based in Milpitas, Calif.

Brown called last week's announcement "an interesting milestone for the company," which will now focus on its data protection and storage systems business. That will include network-attached storage and storage-area networks.

"Storage systems growth has reached tenfold for us in the last 10 years," Brown said. "This presents an incredible opportunity for us to evolve and grow as a company."

William Hurley, an analyst at The Yankee Group in Boston, said Quantum's transformation is in keeping with a trend that has emerged among hard disk drive manufacturers during the past five years. As the cost of storage continues to plummet, making a profit in the disk drive space is getting more and more difficult, he said.

"There used to be nine or 10 hard drive manufacturers," Hurley said. "Now there are really only four big players: IBM, Seagate, Fujitsu [Ltd.] and Hitachi [Ltd.]"

Hurley added that Quantum held 17% of the hard disk drive market in the first half of last year, second only to Seagate Technology Inc. in Scotts Valley, Calif. Maxtor followed with 14%.

Quantum dismissed suggestions that its new direction places it in the competitive path of industry heavyweights IBM and Hopkinton, Mass.-based EMC Corp.

"After all, EMC, IBM and the other major [resellers] are ongoing Quantum customers," a Quantum spokesman said, "and our ... tape products are part of the solution that both EMC and IBM offer their customers." ◗

Driven Out

Other disk drive manufacturers that have ceded the market to the top four companies in the industry include:

- Connor Peripherals
- Micropolis
- Philips Semiconductors
- Hewlett-Packard
- Sony
- Western Digital

SOURCE: WILLIAM HURLEY, THE YANKEE GROUP, BOSTON

BRIEFS

MicroStrategy To Narrow Biz Focus

Beleaguered software vendor MicroStrategy Inc. last week warned that its first-quarter financial results will likely be below expectations. It also announced plans to cut about one-third of its 1,900 workers and focus on its core business intelligence applications. The Vienna, Va.-based developer of data mining software said it will eliminate or downsize "speculative technology initiatives" that aren't directly related to business intelligence.

Intel Taps P2P for Cancer Research

Intel Corp. last week announced a peer-to-peer (P2P) technology initiative designed to further cancer research by enabling PC users with Web access to donate unused computing time to help solve medical research problems. By using the collective idle time of 6 million PCs connected to the Internet, the program could provide as much as 50 TFLOPS of power, Intel said.

Dell Expands Services Portfolio

Round Rock, Texas-based Dell Computer Corp. announced a new set of services, called Premier Enterprise Services, aimed at speeding customization, installation and service of business systems. The services are available now in the U.S. and Canada and are expected to be available worldwide by the end of the year, said Dell. The company didn't provide pricing information.

Short Takes

IBM is consolidating the development, marketing and operations of its ThinkPad and NetVista lines, forming a new organization called the Personal Computing Devices Group. . . . Paris-based telecommunications equipment maker ALCATEL SA said it will lay off about 5% of its U.S. workforce. . . . Bankruptcy rumors salted Murray Hill, N.J.-based LUCENT TECHNOLOGIES INC.'s wounds, causing its stock to plummet as much as 30% April 4 before closing down 13.63%.

Marimba Retunes E-Business Strategy

Software vendor shifts focus toward systems management technologies

BY JAIKUMAR VIJAYAN

Call it a retuning of Marimba Inc.

Five years after making its splashy debut trying to sell "push" technologies, the Mountain View, Calif.-based software maker now simply wants to be known as a vendor of systems management technologies for e-business.

Taking the first steps in that new direction, Marimba last week announced that it's repositioning and repackaging its Castanet and Timbale lines of change and asset management products into different flavors for server, desktop and embedded systems management.

It also announced a performance management suite for monitoring Web-based service and application performance in real time.

The moves are aimed at making it easier for users to understand Marimba's products while establishing its new identity as a systems management firm competing against the likes of Computer Associates Inc., Hewlett-Packard Co. and Tivoli Inc., according to Kia Behnia, a Marimba vice president.

But instead of addressing the entire spectrum of systems management technologies like those companies do, Marimba will focus purely on change and configuration management as well as performance management technologies, Behnia said.

"We want to provide value where we can but not take on so much that we stretch ourselves too thin," he said.

The $44 million company was established in 1996 by Kim Polese, a former Sun Microsystems Inc. employee and Java pioneer. The company started off making a name in what was then a hot market for push technologies, designed to send information directly to desktops over the Internet.

Marimba's strategy builds on its experience in delivering products that streamline the management of applications and content over the Web, said Neal Goldman, an analyst at The Yankee Group in Boston. "They are repositioning the company to be in a broader market category than they used to be," Goldman said. "Their challenge is going to be in establishing a name for themselves in this market, where there are a lot of competitors and one or two big-name vendors."

Marimba's focus on delivering management technologies purely for intranets, extranets and the Internet should help provide some differentiation, analysts said.

The firm's new Web Traffic Monitor software is an example. With the product, administrators will be able to collect and centrally store network and application performance data that can be used for real-time alerting, reporting, trend analysis and capacity planning exercises.

The offering addresses the growing demand for tools that monitor user response times, application performance and network throughput, according to Tim Greiser, an analyst at IDC in Framingham, Mass. "What Marimba is trying to do is to focus on end-to-end performance and response time for Web sites," he said.

But unlike other products, Web Traffic Monitor doesn't require users to install agents or other measuring software at the server or client side to do this analysis, he said. ▶

New Rhythm

Marimba has repackaged its Castanet and Timbale product lines:

Server management product family: Allows customers to control how, when and where content and applications are distributed and activated across Windows NT, Solaris and Linux platforms.

Desktop and mobile management family: Allows users to distribute, update, manage and repair applications across intranets, extranets and the Internet.

Embedded management product family: Supplies tools for creating self-updating capabilities in applications for handhelds, appliances and PCs.

Lotus CEO Addresses Customer Service Woes

At the Admin2001 conference in Boston last week, Lotus Development Corp. President and CEO **Al Zollar** sat down with *Computerworld*'s Jennifer DiSabatino to discuss topics ranging from Lotus' infamous customer service shortcomings to its "bare knuckles" competition with Microsoft Corp. in the messaging and collaboration market.

Q: You said in your keynote address that Lotus needs to improve its customer service and that you would like to see Lotus meet the customer service benchmarks of its parent company, IBM. How long do you think it will take to reach that benchmark? And what constitutes a "critical problem" for your customers?

A: It's an internal time line, but my expectation is, as fast as possible.

Our definition of a critical problem is when our customers' business is impacted so they can't deliver the service that their business depends upon. The real issue is, once you've given them immediate relief, you may still have a bug in the system. So, being able to solve that bug [in seven days] is the time frame that we're talking about.

CEO AL ZOLLAR: "We're winning."

Q: Some customers who complain about poor customer service say Lotus too often blames the network for problems with Notes. What's your response?

A: This is technology that you have to design the infrastructure for. You wouldn't just walk into a house that you didn't hire an architect to design or a structural engineer to design. We try to make sure that customers engineer and architect their infrastructure so that they get the experience that they expect. It's just engineering.

Q: At Admin2001, you acknowledged that one large customer, Accenture, is considering dropping Notes in favor of your main competitor's products, Microsoft Outlook and Exchange. How do you respond to Accenture?

A: We show them economics of things like the value of collaborative applications, shortening cycle time, real-time collaboration and e-meetings. Along with our technological superiority, which no one really disputes, those things in combination are what we talk to customers about.

No one should be naive about the world of competition. We go into competition with bare knuckles. I'll put our record up against anyone's, because we're winning.

Q: How will Rnext, the next release of Notes, integrate with software from vendors of line-of-business applications like IBM and Oracle Corp.?

A: We have a product that customers can use today and are using: the Lotus Enterprise Integrator. The improvements in Rnext essentially make it simpler for our customers to move data, wherever it is, and bring that into a collaborative application scenario with Notes. ▶

MARYFRAN JOHNSON

IT Survival Advice

NOW THAT JOB STABILITY IS IN and stock options are out, a lot of conflicting and obnoxious advice is being handed around to the unfortunate thousands that high-tech companies are slicing off their payrolls every week. Even the imagery used in press releases is unpleasant.

MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at maryfran_johnson@computerworld.com.

One distasteful example I saw last week referred to "deceleration trauma," likening the experience of those companies unprepared for the slowdown to the injuries suffered in a car crash.

This is an "employer's market," we are told, as though it were real estate changing hands instead of people's careers. But jobs don't feel like commodities to those who hold them. It's a lot more personal than that. One reader sent us a note last week, objecting to the use of the word "exploit" in our Page One headline ["IT Recruiters Exploit Layoffs"] and putting in the rare word of support for HR professionals. After living through several layoffs in his own downsizing industry, he rightly applauded those HR departments that have recruiters standing by to help employees find new work more quickly.

Industry research firm Meta Group Inc. recently claimed that IT budgets will continue to grow (the better to afford research advice, I suppose). A California-based consulting firm, RHI Consulting, also chimed in with a big survey where 84% of CIOs polled said the influx of former dot-commers into the market was having "little impact" on IT recruiting efforts (the better to keep hiring those consultants, I suppose). Color me skeptical on both of those reports.

In reading one of our own stories in this week's special careers report ("Can't Live Without Me," page 32), I saw managers cautioned against letting employees become so highly specialized that they can't be replaced. A few paragraphs later, employees are being advised to make themselves as indispensable as possible. "Would your department be lost without you?" may be a question that warms the hearts of IT staffers, but it sure chills the spines of the manager types. Talk about operating at cross-purposes.

The souring economy does mean more candidates in the market, vacancies filling in half the time and IT salaries more sensibly calibrated to reality. And when it comes to IT survival advice, the classics endure: Align technology projects with business strategies. Keep your skills updated and sharp. Look hard at outsourcing to keep crucial work moving forward.

In the end, though, the best IT people will go where they are treated as valued contributors, not dispensable commodities. They'll stay where their work feels like more than just survival.

PIMM FOX

Valley Gains A Presence in The White House

PRESIDENT BUSH has scored big with Silicon Valley by appointing Floyd Kvamme to co-chair the White House's Advisory Committee on Science and Technology.

Kvamme, a born-and-raised San Franciscan, brings an impressive résumé to the job. He became part of the core team that took National Semiconductor from a $7 million-a-year transistor maker to a $1.6-billion semiconductor giant and later led National's former computer subsidiary, National Advanced Systems.

PIMM FOX is *Computerworld*'s West Coast bureau chief. Contact him at pimm_fox@computerworld.com.

He left to run marketing and sales at Apple, helping introduce the Macintosh. In 1984, he became a partner at Menlo Park, Calif.-based venture capital firm Kleiner Perkins Caufield & Byers, where he divided his time among start-ups, charter schools and chairing pro-business think tank Empower America. Kvamme's now advising Bush on policies to spur U.S. technology businesses.

The following are the major issues on his plate:

H-1B visas and education. Kvamme wants a ready supply of skilled and well-trained IT professionals. The problem is that we haven't been graduating enough engineers to meet demand, even in a slowing economy. Kvamme says he's happy that Congress boosted the number of H-1B visas, but he'll push for more. At the same time, he wants legislation that would include tax incentives to increase the number of engineering graduates.

Taxes. Kvamme advocates eliminating the three-year depreciation write-off for software, allowing companies to expense the cost immediately. This helps the bottom lines of companies that buy software and the IT vendors that sell it. He also wants a permanent research and development tax credit to encourage R&D spending.

But the biggest issue Kvamme will face as chief tech evangelist will be to balance the tech industry's desire to sell and develop more IT with users' ability to support technology during an economic slump.

But around Silicon Valley, the heartland of IT innovation, Kvamme's combination of business pragmatism and technology smarts wins accolades. So, having a familiar face tied to the White House can't hurt.

"He's unpretentious and incredibly smart," says Bruce Mowery, vice president of marketing at Redwood City, Calif.-based Support.com. "I met him at Apple back in the early 1980s. He was wearing one of those big rodeo belt buckles, but it turned out to be a bronze apple. He was really proud to be there. Heck, he was a geek in a suit."

Kvamme's integrity and easygoing manner is echoed by Mary Ann Byrnes, CEO of San Mateo, Calif.-based Logictier. "When we first met . . . he was engaging and focused on helping my company at the time," she says. "I am impressed by this appointment. He'll be great, and I'm a Democrat."

But Democrat or Republican (Kvamme is a big GOP donor), his effectiveness will be limited by economic events outside his control. Even Silicon Valley should recognize that. ◗

TODD R. WEISS

CRM Horror Tale: Save an Hour, Lose Four Days

ONLINE ORDERING wasn't supposed to be like this.

Thinking I'd save an hour, I ordered a new 30GB hard drive and package of legal pads online instead of heading out to an office supply store.

But my hour saved turned out to be an evil joke. For the next four days, I spent far more than an hour on the phone with customer service people trying to locate my "one-day" order.

Amazingly, no one could concretely tell me where the package was after it left a warehouse. In a world of wireless communications and satellite Global Positioning Systems, staffers aren't given the phone numbers for warehouses so they can check late orders.

TODD R. WEISS is a *Computerworld* reporter. Contact him at todd_weiss@computerworld.com.

Is it just me or is something wrong here?

After daily apologies and reassurances that my order was "on the truck," I was told that urgent e-mails were sent to the warehouse, asking the staff there to call me personally. They never called. The company did graciously provide store credits and a partial refund because of the trouble, but really, all I wanted was my stuff.

Four days late, the order finally appeared at my door. No explanation for the delay.

Adding to the hassles, orders that arrive in several parts don't come with a single itemized bill, leaving the total charges a mystery until you get your credit card statement. Not a good thing, and though I've complained several times, the representatives don't seem to understand that people want to know how much they pay for something when they get it.

Here's another horror story.

Recently, I ordered a digital card reader from an electronics Web site.

When it arrived the next day as promised, it turns out that I ordered the wrong one because of poor descriptions and similar photos on the site. I was distracted about being certain to order the reader for a PC and not for an iMac, so I didn't notice the vague references to SmartMedia or CompactFlash cards. I needed a CompactFlash card reader but had mistakenly ordered the former.

A customer service rep had the same trouble, saying he didn't know which one I should have ordered, based on the poorly worded site descriptions. A supervisor finally agreed to reimburse me to ship the wrong reader back, but I had to pay again to get the right one.

That's not how it should be.

I've ordered from many online companies without problems. Each time, I received what was ordered, as promised. Selecting the products was clear and easy, and my items shipped with detailed receipts.

So the following are my suggestions for online retailers that still have some catching up to do in customer service:

- Make sure your salespeople can talk directly to your delivery people. A simple telephone call can make all the difference in telling your customers what's going on with their orders.
- Gift certificates and refunds are great to assuage angry customers, but why not fix the problems to begin with and be sure your supply-and-delivery chain is up to snuff before trouble occurs?
- If a customer says something is wrong with your site, listen. It's not difficult to incorporate changes and improve product descriptions if your customers tell you they had a problem with what you have.
- When your customer service people tell customers that someone will call them back, be sure that happens.

Bottom line: If you want your online business to thrive, do what you can to make sure your customers keep coming back. ◗

READERS' LETTERS

Contracts Can Produce Empty Words

I HAVE FOUND out the hard way that getting things in writing isn't as protective as you might think ["Broken Promises," Business, March 5]. Companies go back on promises all the time, and you might have little recourse. In my case, I had it in writing, and the president of the company I was dealing with said, "Sue me."

Thomas Stiehm
Herndon, Va.
tstiehm@hotmail.com

Fighting a Preference Problem

I CAN RELATE to the problems Novell is having ["Users: Novell Needs to Reach Microsoft-minded Executives," *Computerworld.com*, March 22]. We in the Macintosh community have had to deal with Microsoft-centrist mindsets for years. Corporate IT managers aren't at all interested in furthering their companies' capabilities and have no interest in hearing about any technologies without the Microsoft name — no matter how superior. The result is a corporate system that never reaches its potential (if it works at all), escalating costs and a disgruntled workforce.

Andrew White
Support specialist
Kansas City, Mo.

Anybody Remember Who Killed the Milkman?

I HAVE A question for columnist Frank Hayes ["Learn From the Dead," Opinions, March 5]: Do you remember the milkman, the breadman, the iceman or any number of "men" who used to deliver goods right to your door? For the most part, they have all disappeared, eliminated by shrinking margins and rising delivery costs. The dot-coms that tried to sell low-margin items like groceries weren't innovative. They thought technology could change the basic principles of business. They ignored the same economic problem that killed the earlier home-delivery businesses. If there is anything to learn from the "dead," it's that the saying, "Those who cannot remember the past are condemned to repeat it" is still applicable, and the past has been repeated at Internet speed.

John Russo
Computer specialist
West Haven, Conn.

Sun Shines Where Microsoft Doesn't

HAVING written numerous Java applications that are run on Windows NT, Mac OS and Linux PCs and also in a Unix mainframe environment, I must disagree with Microsoft ["Is Java Compatibility Impossible?" *Computerworld.com*, March 3]. It's true that to make things work across the spectrum of hardware and software environments, one must use the least common denominator (at present that means Java 1.1.8 for mainframe and Mac OS compatibility), but it is possible to write once, run everywhere. I will agree that Microsoft may find the task impossible, but that's OK: Sun Microsystems has succeeded admirably. My employer has made the decision to use Java as our core language and to write call methods in lower-level languages (C and Assembler) only when performance is an issue. The savings on reduced redundancy is significant, not to mention that maintenance is simpler and all programmers, regardless of background (PC or mainframe), are able to work on any program.

Mark Van Tuyl
Houston

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

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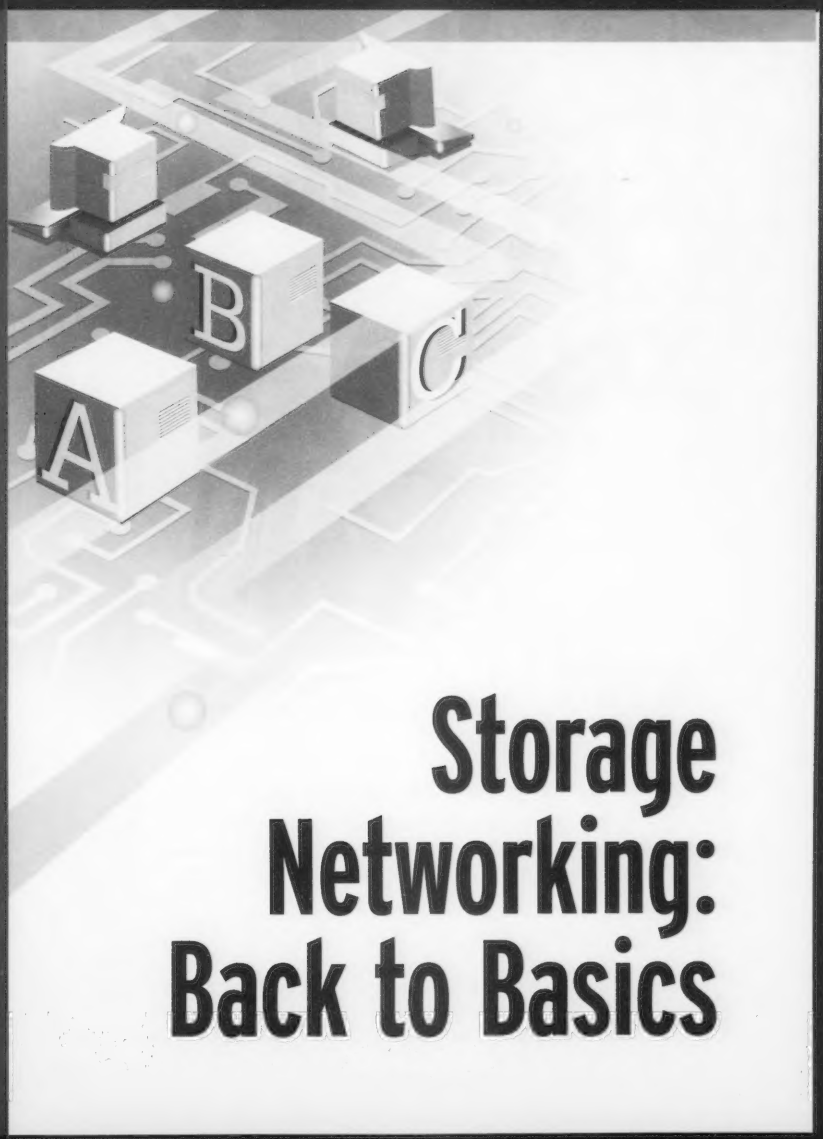
April 9, 2001



Storage Networking: Back to Basics

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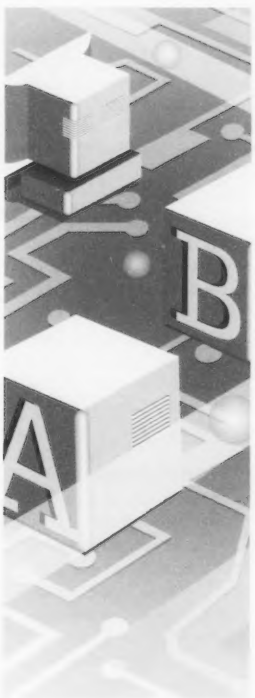

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Storage Networking: Back to Basics

Rarely has there been a more confusing topic than storage networking. I get confused and this is what I do for a living, so I can only imagine the mind-numbing blather that the poor end-users — who have real jobs — have to deal with. This paper will help make sense of it all by explaining some complex storage concepts in layman's terms, including definitions of storage-area networks (SAN) vs. network attached storage (NAS), IP storage, virtualization, storage management and more.

By Steve Duplessie, founder and president, Enterprise Storage Group

Storage Area Network

A SAN is defined by the Storage Networking Industry Association (SNIA) as a network whose primary purpose is the transfer of data between computer systems and storage elements and among storage elements. A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements and computer systems so that data transfer is secure and robust. The term SAN is usually — but not necessarily — identified with block I/O services rather than file-access services.

Another definition of a SAN is a storage system consisting of storage elements, storage devices, computer systems and/or appliances, plus all control software, communicating over a network.

Milford, Mass.-based Enterprise Storage Group, like SNIA, believes that "networked storage" means block and file data over some kind of network connecting multiple devices to multiple hosts. Neither group believes the term SAN should be connected with Fibre Channel, but alas it is. Enterprise Storage Group suggests users think about SAN as storage networking to remove some of the preconceived notions out there. The bottom line is a storage-area network and a storage network really mean the same thing: They both consist of network, any kind of interconnected storage devices and servers where block and/or file data is passed among elements.

Network Attached Storage

NAS is defined by SNIA as storage elements that connect to a network and provide file access services to computer systems. A NAS storage element consists of an engine that implements where data is stored. NAS elements may be attached to any type of network. When attached to a SAN, NAS elements may be considered members of a SAN-attached storage class of storage.

NAS is a class of systems that pro-

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vide file services to host computers. A host system that uses network attached storage uses a file system device driver to access data using file access protocols such as Network File System (NFS) or Common Internet File System (CIFS). NAS systems interpret these commands and perform the internal file and device I/O operations necessary to execute them.

NAS, simply put, means "file" data. Storage networks can include both file data and block data, on the same or different types of interconnects. We could have "file" services delivered by a NAS device over Ethernet, Infiniband, IP or even Fibre Channel.

True storage networking needs to be ambiguous. We may have two or more protocols running simultaneously: For example, we may use iSCSI to create an Ethernet-based SAN for block storage where the hosts connect via Ethernet but the storage device is connected via Fibre Channel.

NAS services may sit on top of the same Ethernet infrastructure and use the Fibre Channel disk array as a back end.

SAN vs. NAS — The War Of The Storage Worlds. Sorry, but with all the time spent on this subject, it had to sound bigger than it really is. Enterprise Storage Group believes that the war is over — and both won. Don't think of it as SAN vs. NAS. Think of it as "I need a storage network, and within my storage network I may need both block data (SAN), and file data (NAS)."

Both file and block data already exists within a storage network infrastructure. Don't worry about choosing since most application environments will do that for you. As a general rule of thumb, NAS is cheaper and easier to implement and manage. It can be configured to operate very fast. If you need block data (although most applications no longer require pure block data) you should attach a block device or devices to a storage network. You can run both simultaneously, though you most likely wouldn't run them over a common bus such as Ethernet.

Currently, if you need block data, you're going to use Fibre Channel for a block storage network. If you need NAS, you're going to use Ethernet. But, in the not so distant future, you'll have more choices. Those two architectures will be joined by a third architecture called, Infiniband — but fret not, all will play nicely together.

But remember you have more critical decisions to make. Prepare your environment to deal with both block and file data, and you'll never be behind the eight-ball.

The Transports

People often confuse "protocol" with "transport." You can think of the transport as the type of pipe that the data is traveling on, or a road. The protocol is the makeup of what is in the pipe (the type of car on the road). It gets very confusing because SCSI is both a protocol and a transport. Fibre Channel is really a transport that speaks SCSI (in our world) as a protocol. Confused? Let me explain.

When you hear about storage over IP, or iSCSI, people are really saying block data over an IP (Ethernet) network, or SCSI (protocol) over IP (transport).

Your next question might be "What is iSCSI?" It is a proposed standard by Cisco Systems Inc. and IBM that allows block data transfers over Ethernet. There is a lot more Ethernet out there than Fibre Channel and iSCSI offers a set way to create a storage network that uses Ethernet as a transport. Small to mid tier companies that haven't been able to justify the leap to Fibre Channel will most likely hop on the iSCSI bandwagon.

Here's how it works. A server will see the storage it is connected to as it does standard SCSI or Fibre Channel direct attached storage. The reality is that instead of the SCSI driver sending commands down the SCSI or Fibre host bus adapter (HBA), an iSCSI driver will intercept the request, repackage it, and ship it through the NIC card (or a special iSCSI HBA), over Ethernet, where it connects to either an iSCSI disk array, or an iSCSI intermediary. The iSCSI intermediary is a black box that converts between iSCSI commands and the disk array protocol — Fibre Channel or SCSI typically.

Storage Virtualization

This is the concept of creating "virtual storage pools" out of discrete physical storage elements.

The concept isn't new but is moving to the mainstream. Consider that storage virtualization has existed for a long time, initially in the form of volume management. A volume manager was a piece of server software that allowed the operating system of

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that specific host to have a logical view of a physical device.

For example, when many operating systems had a file system that could deal only with a maximum device size of 2GB, the volume manager would enable a 10GB disk to appear as five 2GB logical disks, and therefore make the disk usable. The second wave of storage virtualization occurred in the disk array itself.

Large arrays utilized internal virtualization to make the array usable among multiple hosts. This was necessary because volume managers work great for single hosts, but not once there is more than one attached to a singe device.

The new concept of storage virtualization is the externalization of virtualization from both the hosts and the storage — a virtualization engine that resides somewhere in the storage "cloud." This is required because just like we needed device-based virtualization to deal with multiple hosts, we need externalized cloud-based virtualization to deal with multiple storage devices and multiple hosts.

Moving this function to the storage cloud makes a lot of sense and will give users much greater flexibility in the products they chose.

The external virtualization schemas — sometimes called SAN appliances — fit into two main categories: In Band and Out-of Band.

In-Band virtualization engines run on some kind of hardware — either a specialized box or an off the shelf PC. In both cases, all the data running between the host server and the storage itself runs through this engine. The engine takes all the physical storage behind it and presents it any way the user wants to the servers on the network. The benefit of an In Band approach is that there is no host software required.

A potential negative effect of this approach is that In Band runs the risk of becoming a bottleneck at some point. Market leaders in this space include DataCore Software Corp. and StorageApps Inc. FalconStor Inc. could be considered a hybrid In Band virtualization engine, which also does iSCSI-type networking.

Out-of-Band virtualization engines sit on a special box that connects to the storage network but isn't in the data path. This approach offers no scale limitations but does require special host software/drivers that may either be software or firmware embedded in a special HBA. StoreAge Networking Technologies Inc. is the only player today in this space, but Compaq Computer Corp. has announced its VersaStor initiative, and IBM is also expected to enter this sector later this year.

Serverless backup technologies will enable IT departments to back-up data in real-time, all the time, online. This is the first step toward operational IT utopia.

Who is the winner? It is much too early to tell. What Enterprise Storage Group can tell you is this: Pick a methodology and get into the virtualization game. The more experience you get with these technologies before you're faced with a massive data growth and huge capital expenditures the better prepared you will be. Enterprise Storage Group feels that this is not a technology that you should watch from the sidelines.

Serverless Backup

Enterprise Storage Group believes that serverless backup represents a fundamental change in both the way large-scale data centers will operate, and is arguably one of the most significant operational benefits the user will have ever derived. Today, most backup schemas require downtime to guarantee data accuracy. Our firm reported a few months ago that more than 70% of enterprise-class data operations perform "selective backup." For example, they have to choose what not to backup in order to meet their available backup window. For analysts like me, this is truly frightening. It isn't about backup — it's about restore. The ability to restore valid data quickly is the essence of IT. Serverless backup technologies will enable IT departments to back-up real-time data, all the time, online. This

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Serverless backup will enable users to perform backups at any time, and they will no longer need to dedicate the full resources of a server to perform these backups. In a traditional environment, a server would initiate a backup, read data from disks into its main memory and write the data from memory onto tape. This is a very disruptive process, which is why performance backup has been so poor. In the new way of doing backup, the server initiates the backup, but doesn't sit in the data path as data from the disk array is passed directly to the tape drive. This provides a huge performance boost and eliminates unnecessary server CPU cycles.

This technology is still not proven to be ready for prime time, but it's getting there. Veritas Software (Vertex), Legato Systems Inc. (Celestra) and Computer Associates International Inc. (ArcServe) all are making inroads. ArcServe and Vertex will work only with their respective products, while Celestra appears to be able to run under any Network Data Management Protocol (NDMP)-compliant backup software. Expect to see real progress by this fall.

Storage Management

Storage Management may sound like an oxymoron to any current storage administrator, and to a large degree it really is.

Most storage management to date has been nothing but a collection of disparate management applications used for specific discrete devices.

SNIA is doing a good job of changing that by making sure everyone plays by the same rules and creates a standard management interface that everyone can use.

The good news is that standards are getting better. Enterprise Storage Group can't tell you when standards will really be there, but they are finally getting the attention they deserve.

Storage resource management (SRM), on the other hand, is pretty much ready for prime time (see story page, 16). SRM is a subset of storage management, and initial products focus on device utilization and cause/effect issues. I'm a fan of SRM and the users we speak to who have it, in one form or another, swear by it.

SRM will help any midsize to large IT organization to better control resources and will quickly offer significant return on investment. Enterprise Storage Group believes that overall storage management will offer the same benefits, once it becomes reality. Storage management represents up to 90% of the costs of building and maintaining a storage architecture today. Enhancing management will allow users better control and much better asset utilization — huge advancements considering online storage is still growing at 100% per year.

Almost every management tool for storage to date has been designed to manage a single manufacturer's product.

That was fine when everything was homogeneous, but now the world is different. Users have plenty of choices for hardware, but limited choices for software. The good news is that there are some companies working on the problem, including independent third party vendors such as Connex Inc. and Prisa Networks. EMC Corp. has a strong storage management suite of software tools but are restricted to only EMC Symmetrix customers. EMC has recently said it will support both Hitachi Ltd. and Compaq storage devices within its management framework. The tools are great but it's expensive, no one is going to buy it today unless already an EMC disk customer.

Storage management vendors include HighGround Systems, recently acquired by Sun Microsystems Inc., Astrum Software Corp., BMC Software Inc. and WQuinn Associates Inc. Enterprise Storage Group encourages users to check them all out and see what fits best with their needs.

Duplessie is founder and president of Enterprise Storage Group in Milford, Mass. You can send him e-mail at: steved@enterprisestoragegroup.com

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Infiniband

Infiniband is an Intel Corp. technology that in essence will replace the Peripheral Component Interconnect (PCI) bus as an interconnect on most systems in the coming years.

There is a lot of talk about what else it can do, such as cluster interconnect, storage network interconnect and more. Its biggest strength is that it is very fast — 2.5G bit/sec. for a single "link" — and multiple links can be "aggregated" together to form much faster links — four times faster, or 10G bit/sec. is already under way. Infiniband, unlike PCI, works off the system memory bus — so I/O doesn't require as many interrupts. Because it is so fast, we will be able to build more complex systems that require greater I/O and less CPU.

Infiniband is being investigated for use both within large disk arrays, and externally for connectivity. Infiniband systems will first come on the scene late this year and early next year — mostly in very high-end, four-way and eight-way Intel systems. All the others will follow, and within four years Enterprise Storage Group expects most of the systems out there will be Infiniband-based. There are those who argue that this will become another ill-fated Intel mission, and others who wonder why Intel doesn't use 10G-bit Ethernet, but Enterprise Storage Group believes that Infiniband will flourish and in a big way.

What will that mean for legacy Ethernet and Fibre Channel storage users? Nothing. Intel and others will build bridges to allow users to connect a legacy infrastructure to an Infiniband network.

Most major storage vendors are looking at the technology, preparing to hop on the bandwagon in one way or another. Will we have native Infiniband disk arrays? Potentially. In the near future you can expect vendors to remain neutral, knowing they will be able to bridge in the interim. If it really takes off vendors can relatively easily put Infiniband front-ends on their array controllers. Will we see Infiniband disk drives? That's doubtful. If Infiniband is successful, it will drive costs way down, so it could well become the bus of choice for the long haul.

IP Storage

In general, IP storage is a new way to use Ethernet as a medium to deliver storage services. There are four categories that Enterprise Storage Group sees in this space. They include Ethernet storage arrays, mid-range mediation sector, SAN extension sector and large-scale storage mediation sector. Here's a description of each:

Ethernet Storage Arrays. These will enable block data to occur over Ethernet in a networked configuration — effectively creating the same benefit of a Fibre Channel network, but using Ethernet instead.

For example, 3Ware Inc. builds a disk array that is iSCSI-compliant. The disk array plugs into an Ethernet port. The servers for the storage network also plug into Ethernet ports. Those servers run an iSCSI driver — as software today, but will be embedded on HBAs in the future — so that they see the 3Ware array as if it were a locally attached device.

IBM has also announced an iSCSI-ready disk array, and the market can expect to see many more. This space is predominately attractive because it brings the benefits of storage networking to the mass market — the low-end and midrange of the IT world. These folks haven't bought into Fibre Channel SANs yet, mostly due to complexity and cost. Enterprise Storage Group expects the volumes in this sector to be huge. Performance is less of a concern here, as cost and simplicity are overriding factors.

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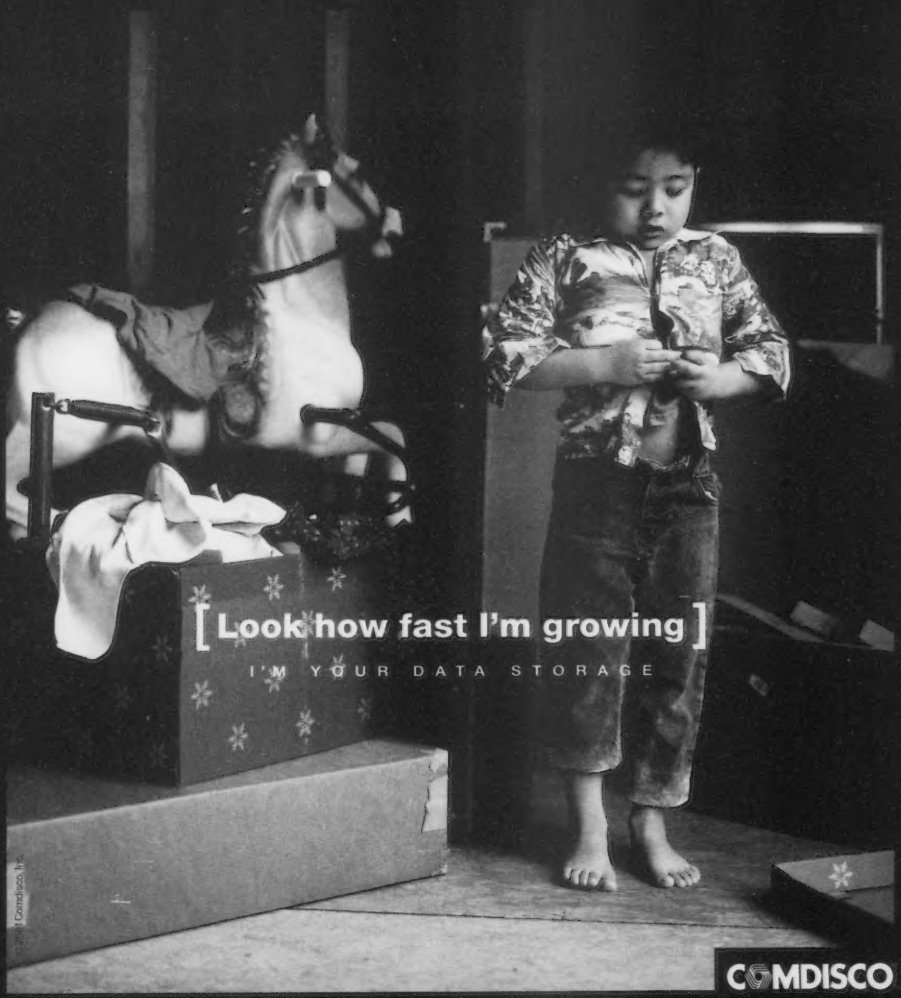

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Storage initiatives and when you can expect them to hit the mainstream

IP Storage	
iSCSI Arrays	**April 2001**
iSCSI Ethernet Switches (Enabling Ethernet SANs)	**July 2001**
iSCSI SAN Extension	**October 2001**
iSCSI Mega Switches (Mediation Engines)	**January 2002**
Storage Virtualization	
In-Band Appliances	**April 2001**
Out-of-Band Applications	**November 2001**
Hybrids	**January 2002**
Infiniband	
Servers	**January 2002**
Switches	**April 2002**
Bridges to Legacy (Ethernet and Fibre Channel)	**July 2002**
Serverless Backup	**August 2001**

The Mid-Range Mediation sector: This provides somewhat small port count switches/routers that effectively perform the same function as Ethernet disk arrays, but instead enable a Fibre Channel, or SCSI, disk array to be attached using Ethernet connections to the servers. The servers still run an iSCSI or like driver and see the Fibre Channel disk array as if it were attached the entire way on Fibre. Nishan Systems, Nuspeed Internet Systems Inc., recently acquired by Cisco, SANCastle Technologies Inc. and even Virtualization players like FalconStor and StorageApps are in this space.

The only problem here is that this will enable more complex storage networks, where there is both Fibre Channel legacy gear along with Ethernet to co-exist.

The SAN Extension Sector: This ties one or more Fibre Channel SANs together, using Ethernet in the middle. It enables users of disparate SAN "islands" to join them together for simplistic management and data movement. The islands can be connected over a local-, metropolitan-, or wide-area networks.

Players here include Entrada Networks Inc., SAN Valley Systems Inc., Nishan, Computer Network Technology Corp. and SANCastle. This sector represents the easiest entrance into the enterprise data center, as those folks already have multiple Fibre Channel SANs and tying them together will make their lives easier.

Large-Scale Storage Mediation Engines: These build carrier class (director level) switches with tons of Ethernet and Fibre Channel ports. They may also provide storage virtualization engines. This allows users to create NAS instances out of back-end block devices for example. They aim to become the core switch fabric for those who need to blend both storage networking and traditional networking infrastructures. Players in this space include Pirus Networks and Rhapsody Networks.

There are lots of nuances that separate these sectors, and plenty more players not mentioned, but this should give you some idea of what everyone is rambling about. Expect a flurry of announcements and activity this year.

The Bottom Line

Storage is very complex, and is becoming more so everyday. On one hand, that poses an opportunity to the vendor community, and on the other hand it makes end users want to rip out their hair. The good news is that there has never been more money being pumped into storage-related R&D. There have never been more storage start-ups, and there has never been a bigger need for storage partners and technologies. Today's problems will be solved. There will be new superpowers in the storage sector, just as EMC, Veritas, Network Appliance Inc. and Brocade Communications Systems Inc. reign today.

The stakes have never been higher. You need to build a storage network, and design flexibility into your enterprise. You need to address the demands of upper management with the assurance your infrastructure will be able to accommodate.

Do all that and you'll be the unsung hero.

What is SRM?

To the IT manager, SRM includes the tools, the people who use them, the policies and procedures, the hardware used to meet the storage demand, the operating system that runs storage, the hubs and switches that connect it and the software that provides media management, volume and file management and data movement solutions for disaster recovery and business continuance.

To the administrator, SRM is a solid night's sleep without an emergency call that the application is down due to an out-of-disk space condition.

To the user, SRM is the ability to have unlimited capacity as well as continuous access to information 100% of the time.

To the company, SRM is the ability to control costs, provide business continuance and have continuous availability of information to make timely and competitive business decisions.

-Lisa Hart,
industry analyst,
In_fusion

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Ohio State University gets high marks for its implementation of high-end storage

Case Study

The Ohio State University's main campus in Columbus is one of the country's top public universities. It's also one of the largest, with about 48,000 students and more than 4,500 faculty members; only the University of Texas at Austin boasts a larger enrollment.

Ohio State University's annual budget tops $2 billion. That's a major-league organization, and the IT operation and storage needs are commensurately large. That's where XIOTech's MAGNITUDE came in.

Growing Pains

In 1998, the university's Fisher College of Business faced a major headache: Storage needs were growing much faster than capacity. With 4,500 students plus faculty, the school found itself outgrowing servers every 18 months. Storage requirements were skyrocketing; Fischer needed a storage solution that scaled.

Fischer's IT department had other ambitious plans, too. For starters, the school needed a solution that didn't create so much wear and tear on disk drives. Computer lab users had to save their work to a floppy or ZIP drive after every session, and according to Rob Kinney, a network developer and engineer, "We had three or four drives a day dying."

Replacing the drives was eating into IT employees' time. So one priority for Fischer was creating personal storage drives on the network for each student and faculty member. "We wanted at least 100 megabytes of disk space per student," Kinney says. "With 4,500 students, it adds up pretty quick."

Another important requirement was that the storage solution interoperate with the school's mixed environment of Sun Microsystems Inc., Novell Inc. and Microsoft Corp. Windows NT servers. In addition, 24/7 operation was a must; college students are well known for their late-night study hours, and the IT staff at Fischer was determined that the computer lab would accommodate those students — who were, after all, the customers.

When Fisher College of Business began to examine its options, the IT and networking staff were surprised to find that its mixed environment threw some storage vendors for a loop.

This wasn't true, however, of XIOtech Corp., a subsidiary of Seagate Technology Inc. and a leading provider of storage-area networks (SAN). XIOtech's solution could handle the mixed environment, and in fact the company has since added support for the Macintosh, Linux and every flavor of Unix. Thus, despite the preponderance of what Kinney calls "all those big guys out there" in the storage field, the business college technologists decided to take a long look at XIOtech.

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The SAN Solution

Why SANs? Because a SAN allows an array of devices to access storage seamlessly, it was a good fit for Fischer's changeable user base. Also, with a SAN, data backup is automatic and storage consolidation is centralized. All of this adds up to easier administration.

Show and Tell

At the conclusion of a two-hour meeting, Fischer's IT group was sold on MAGNITUDE. "They sat down and showed us everything, inside and out," Kinney says. "To prove their point about redundancy and data security, they just started yanking drives out" of a MAGNITUDE box without losing an iota of data, thanks to a high-performance RAID controller. The architected SAN is the only storage solution that incorporates that RAID controller, an eight-port Fibre Channel switch, storage volume management software and up to 64 drives — all in one box.

Easing Into It

Ease of use was another strong selling point for the Fischer team. "After two hours, we knew how to use it," Kinney says. "The management console is really straightforward." As a bonus, Kinney found that XIOtech makes it easy to change its SAN's volume configurations; competitors sometimes insist that their own technicians perform these chores, which can lead to expensive service fees.

Conversely, MAGNITUDE incorporates redundant, hot-swappable components that let IT workers add disks and servers on the fly. Moreover, if server clustering is needed, XIOtech's cluster-ready architecture offers an invaluable many-to-many failover capability.

The key to MAGNITUDE's shared storage is the REDI Storage Manager, which lets users combine the performance and capacity of up to 64 physical drives into a single vast pool. Up to 256 virtual drives can be created and assigned to up to 192 heterogeneous servers. This storage sharing allows efficient capacity planning, fast configuration and seamless scalability.

"Now, all students and faculty have home and Web accounts. All the storage for our Web server runs off XIOtech, too. We've had no performance problem whatsoever. They were very forward-thinking when they put this together."

REDI and Willing

Once they saw the demo, the IT team from Fischer College quickly made up their minds that this was the right solution. According to Kinney, the installation was painless. And MAGNITUDE's scalability has proven itself constantly. "You get all these new students every year, and they tend to stay around four or five years," he says. "The number of accounts keeps growing . . . XIOtech's expandability is amazing; we've been hooking boxes in left and right."

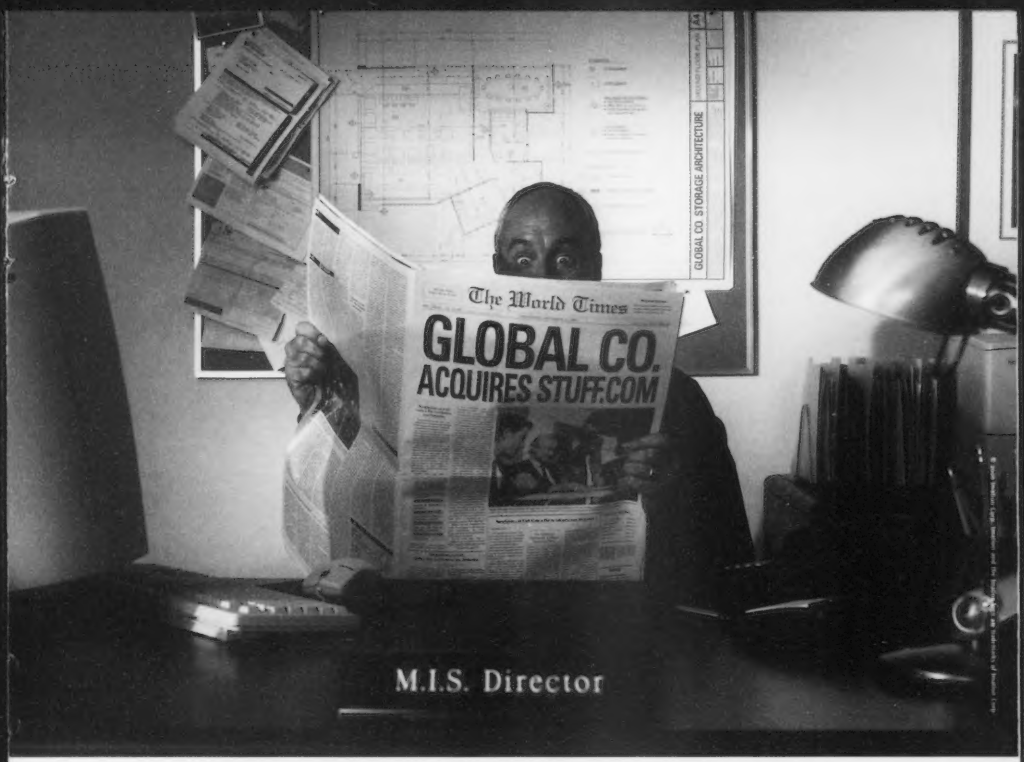
Since Fischer selected MAGNITUDE, other storage options have come along; network-attached storage (NAS) and storage provided using the application service provider, or ASP, model are perhaps the best known. But the college is firmly convinced SAN was the right move and has never been tempted to change course.

Kinney says the scalability and ease of use of the XIOtech storage solution have made the decision to stay with MAGNITUDE a "no-brainer."

Pleasing the Customer

One reason for that is happier clients. Before implementing the XIOtech solution, Fischer's student body grumbled about the computer lab — partly due to the disk-drive problems, which always seemed to have a few boxes out of commission, and partly due to the necessity of storing their work to a floppy disk with every session. Today, the students are much happier — the systems are always up, and the valuable time of IT staffers has been freed up for other work.

"Now, all students and faculty have home and Web accounts," Kinney says. "All the storage for our Web server runs off XIOtech, too. We've had no performance problem whatsoever. They were very forward-thinking when they put this together."



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— **Robert Infantino, President and CEO, Astrum Software.**

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— **Chris Gahagan, Vice President and General Manager, Recovery and Storage Management, BMC Software**

"Our customers emphasize vendor independence, the need to manage all storage systems (hardware and software) in a centralized, consistent way. CA-Vantage focuses heavily on this key requirement, both on OS/390 and open systems."

— **Ian Chudleigh, Product Owner, CA-Vantage, Computer Associates International**

"Storage networks can't meet their promise of providing infinite scalability and flexibility without management tools that give users simple to understand information about their status and trends. Storage resource management is key to enabling the transition to anytime, anywhere information."

— **Robin Purohit, senior director of product management for SAN and Clustering, Veritas Software**

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— **Dave Cotter, Executive Storage Consultant, Hitachi Data Systems**

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"Compaq believes that storage management software is a vital ingredient in building a complete storage solution. These tools enable businesses to unlock incredible benefits, specifically from Open SAN (storage area network) environments, by improving operational efficiency, customer service levels and overall business flexibility."

— **Mark Lewis, Vice President, Enterprise Storage Software, Compaq Computer Corp.**

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BYOBroadcast chooses the managed storage alternative

Case Study

Today, Web site applications require storage and protection of tremendous amounts of data. Even traditional Web sites can require terabytes of storage capacity. Storage management requires trained engineers to supports a 24/7, business-critical Internet commerce operation. Unfortunately, many companies don't have the time or resources to dedicate solely to storage management.

Instead, they need to focus on their core competencies to ensure the success of their e-business. Storage management outsourcing is a cost-effective alternative for these companies.

Recent Research

According to Dataquest, the storage utility market will grow to more than $8 billion by 2003. Concurrently, there is a growing trend of companies outsourcing their Web site management. Therefore, it makes sense for companies that are already outsourcing other parts of their Web infrastructure to extend that to their storage needs. Managed storage offerings allow companies to do business without having to worry about their storage capabilities or taking critical data off line.

Managed storage solutions are particularly important to companies such as Woburn, Mass.-based BYOBroadcast. The leading provider of streaming audio technology allows companies such as Elektra and Atlantic Records, Cable and Wireless, the Ladies Professional Golf Association (LPGA) and the president of Panama to easily personalize Web sites and e-mails with anyone's voice.

Proven Technology

BYOBroadcast's technology lets real estate agents, for example, easily add audio descriptions to online home listings and narration to virtual tours and Web sites. Agents can dial a phone number, enter a password and record a voice message that BYOBroadcast uploads to the Web site within five minutes. Visitors can listen to the audio without plug-ins or software downloads.

To make these applications possible, BYOBroadcast must store terabytes of streaming media data. However, the company doesn't have the resources to handle this important function internally. With its previous co-location provider, BYOBroadcast's site suffered service interruptions. The company was also spending too much money on service and system upgrades.

The co-location provider also couldn't provide BYOBroadcast with any more rack space. That's when Jeff Valentine, executive vice president of BYOBroadcast, started evaluating managed application hosting providers to find a more complete set of managed hosting services.

The Best Choice

After looking at PSINet Inc., Loudcloud Inc. and other companies, BYOBroadcast turned to NaviSite Inc. for its combination of Web hosting and managed storage services.

NaviSite provides 24x7 monitoring and management of BYOBroadcast's site network connectivity, data storage systems, firewalls, and database and Web servers. NaviSite also provides the

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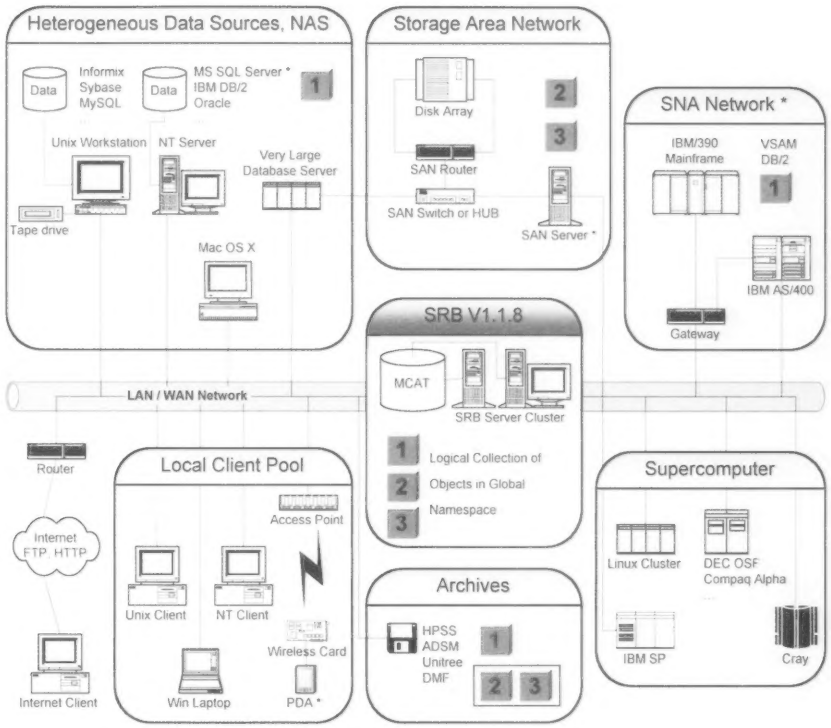

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storage experts needed to monitor and manage BYOBroadcast's storage information infrastructure, which is based on EMC's industry-leading Symmetrix Enterprise Storage system hardware and software.

"NaviSite offered a more comprehensive solution than the competitors as well as a single point of management for our critical Web applications. This is crucial because it allows us to reassure end users that we are managing, protecting and making their essential data continuously available," Valentine says.

Strength of Services

The new outsourced storage solution provides BYOBroadcast with multiple services including proactive monitoring and management, change and capacity management, and scalable multiple-terabyte storage.

It also includes a range of managed storage features such as nondisruptive backup, rapid data restoration and point-in-time data copies that the company can use for reporting and data mining without impacting the performance of its Web site.

All Outsourcing

It was an easy choice to outsource all of its back-end hosting and storage management, Valentine says. BYOBroadcast's proprietary software resides on NaviSite's servers. NaviSite handles any problems — or potential problems — without getting BYOBroadcast involved. This leaves the company with more time to focus on its core business competencies.

"By outsourcing to NaviSite we were able to significantly reduce our capital investment and information technology resources," Valentine says.

"We also gained attractive lease terms for leading technology and services from premier systems and software suppliers like EMC, enabling us to create a high-demand storage environment that meets our needs today and in the future," he says.

The business case for outsourcing is a simple one. BYOBroadcast enables real estate agents to provide unique functionality and value to their customers while still staying focused on their own line of business, selling houses. In the same way, NaviSite enables BYOBroadcast to provide functionality and value to its customers while staying focused on its own line of business, providing streaming audio services.

What to look for when shopping for a managed storage solution

Companies like BYOBroadcast need to look for several key elements when evaluating providers:

- Business continuance options to improve performance and reduce downtime
- Cross-data-center mirroring and replication, for disaster recovery situations
- Detailed storage reporting
- Service-level agreements, to guarantee certain levels of performance for specific installations
- Operational metrics to back up service level-guarantees

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SNIA

A Dictionary of Storage Networking Terminology

Common storage networking-related terms and the definitions applied to them by the Storage Networking Industry Association

block
CONTEXT [Fibre Channel] [Storage Device] [Storage System]
1. The unit in which data is stored and retrieved on disk and tape devices. Blocks are the atomic unit of data recognition (through a preamble and block header) and protection (through a CRC or ECC).
2. A unit of application data from a single information category that is transferred within a single sequence.

Common Internet File System
CONTEXT [Network]
A network file system access protocol originally designed and implemented by Microsoft Corporation under the name Server Message Block protocol, and primarily used by Windows clients to communicate file access requests to Windows servers. Abbreviated CIFS. Today, other implementations of the CIFS protocol allow other clients and servers to use it for intercommunication and interoperation with Microsoft operating systems.

disk array
CONTEXT [Storage System]
A set of disks from one or more commonly accessible disk subsystems, combined with a body of control software. The control software presents the disks' storage capacity to hosts as one or more virtual disks. Control software is often called firmware or microcode when it runs in a disk controller. Control software that runs in a host computer is usually called a volume manager.

Ethernet
CONTEXT [Network]
The predominant local area networking technology, based on packetized transmissions between physical ports over a variety of electrical and optical media. Ethernet can transport any of several upper layer protocols, the most popular of which is TCP/IP. Ethernet standards are maintained by the IEEE 802.3 committee. The unqualified term Ethernet usually refers to 10 Mbps transmission on multi-point copper. Fast Ethernet is used to denote 100 Mbps transmission, also on multipoint copper facilities. Ethernet and Fast Ethernet both use CSMA/CD physical signaling. Gigabit Ethernet (abbreviated GBE) transmits at 1250 Megabaud (1Gbit of data per second) using 8b/10b encoding with constant transmission detection.

Fibre Channel
CONTEXT [Fibre Channel]
A set of standards for a serial I/O bus capable of transferring data between two ports at up to 100 MBytes/second, with standards proposals to go to higher speeds. Fibre Channel supports point to point, arbitrated loop, and switched topologies. Fibre Channel was completely developed through industry cooperation, unlike SCSI, which was developed by a vendor and submitted for standardization after the fact.

host bus adapter
An I/O adapter that connects a host I/O bus to a computer's memory system. Abbreviated HBA. Host bus adapter is the preferred term in SCSI

contexts. Adapter and NIC are the preferred terms in Fibre Channel contexts. The term NIC is used in networking contexts such as Ethernet and token ring. cf. adapter, host adapter, I/O adapter, network interface card, NIC.

in-band (transmission)
CONTEXT [Fibre Channel]
Transmission of a protocol other than the primary data protocol over the same medium as the primary data protocol. Management protocols are a common example of in-band transmission.

network attached storage
CONTEXT [Network] [Storage System]
1. A term used to refer to storage elements that connect to a network and provide file access services to computer systems. Abbreviated NAS. A NAS Storage Element consists of an engine, which implements the file services, and one or more devices, on which data is stored. NAS elements may be attached to any type of network. When attached to SANs, NAS elements may be considered to be members of the SAS class of storage elements.
2. A class of systems that provide file services to host computers. A host system that uses network attached storage uses a file system device driver to access data using file access protocols such as NFS or CIFS. NAS systems interpret these commands and perform the internal file and device I/O operations necessary to execute them. cf. storage area network

Network Data Management Protocol
CONTEXT [Backup]
A communications protocol that allows intelligent devices on which data is stored, robotic library devices, and backup applications to intercommunicate for the purpose of performing backups. Abbreviated NDMP.
An open standard protocol for network-based backup of NAS devices. Abbreviated NDMP. NDMP allows a network backup application to control the retrieval of data from, and backup of, a server without third-party software. The control and data transfer components of backup and restore are separated. NDMP is intended to support tape drives, but can be extended to address other devices and media in the future. The Network Data Management Task Force has a web site at http://www.ndmp.org.

Network File System (protocol)
CONTEXT [File System]
A distributed file system and its associated network protocol originally developed by Sun Microsystem Computer Corporation and commonly implemented in UNIX systems, although most other computer systems have implemented NFS clients and/or servers. Abbreviated NFS. The IETF is responsible for the NFS standard.

network interface card
CONTEXT [Network]
An I/O adapter that connects a computer or other type of node to a network. Abbreviated NIC. A NIC is usually a circuit module, however, the term is sometimes used to denote an ASIC or set of ASICs on a computer system board that perform the network I/O adapter function. The term NIC is universally used in Ethernet and token ring contexts. In Fibre Channel contexts, the terms adapter and NIC are used in preference to host bus adapter. cf. adapter, host bus adapter, I/O adapter

out-of-band (transmission)
CONTEXT [Fibre Channel]
Transmission of management information for Fibre Channel components outside of the Fibre Channel network, typically over Ethernet.

Peripheral Component Interconnect
A bus for connecting interface modules to a computer system. Abbreviated PCI. Variations of PCI support 32 and 64 bit parallel data transfers at 33 and 66 MHz cycle times. A 133 MHz PCIX has been proposed by Compaq, HP, and IBM.

protocol
CONTEXT [Fibre Channel] [Network] [SCSI]
A set of rules for using an interconnect or network so that information conveyed on the interconnect can be correctly interpreted by all parties to the communication. Protocols include such aspects of communication as data representation, data item ordering, message formats, message and response sequencing rules, block data transmission conventions, timing requirements, and so forth.

serverless backup
A disk backup methodology in which either the disk being backed up or the tape device receiving the backup manages and performs actual backup I/O operations. Server-free backup frees the LAN server to perform I/O operations on behalf of LAN clients and reduces the number of trips the backup data takes through processor memory. Differentiated from LAN-free backup in that no additional SAN appliance is required to offload backup I/O operations from the LAN server.

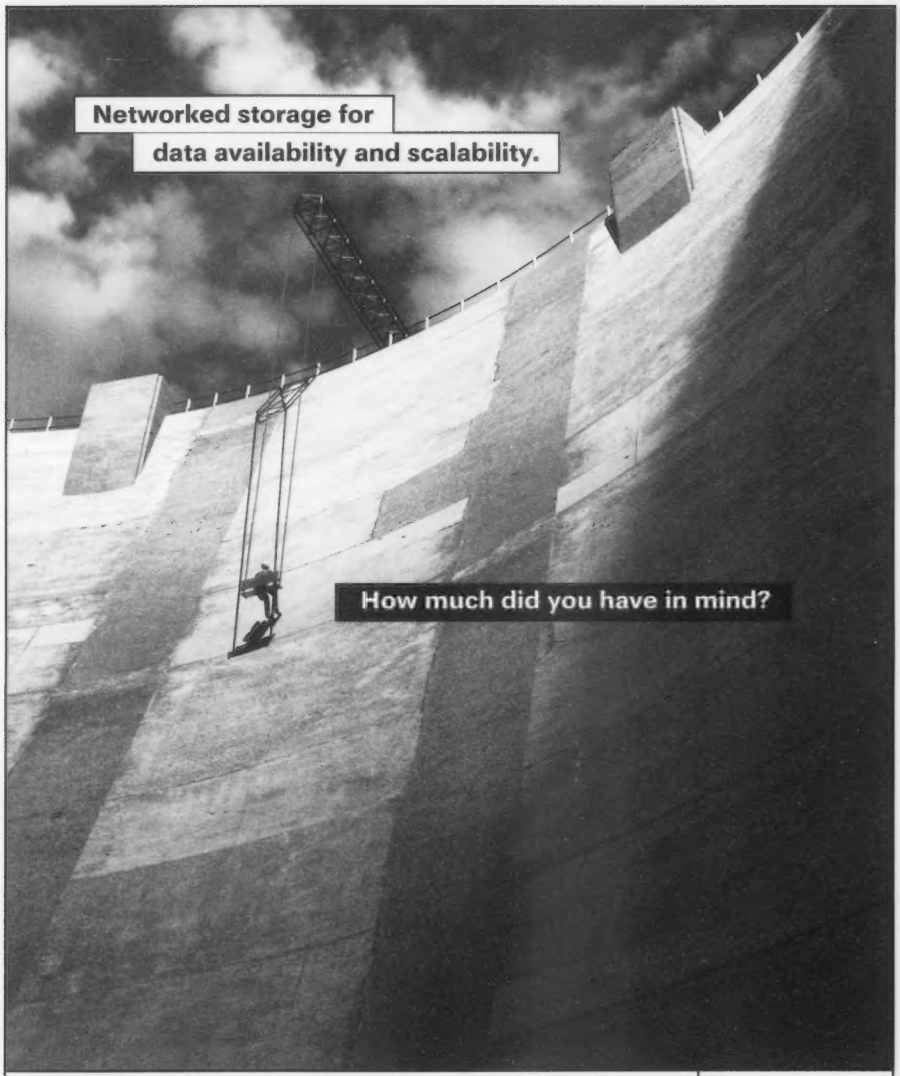
Small Computer Storage Interface (SCSI)
CONTEXT [SCSI]
A collection of ANSI standards and proposed standards which define I/O buses primarily intended for connecting storage subsystems or devices to hosts through host bus adapters. Originally intended primarily for use with small (desktop and desk-side workstation) computers, SCSI has been extended to serve most computing needs, and is arguably the most widely implemented I/O bus in use today.

SAN attached storage
A term used to refer to storage elements that connect directly to a storage area network and provide file, database, block, or other types of data access services to computer systems. Abbreviated SAS. SAS elements that provide file access services are commonly called Network Attached Storage, or NAS devices. cf. NAS

storage area network
CONTEXT [Fibre Channel] [Network] [Storage System]
3. A network whose primary purpose is the transfer of data between computer systems and storage elements and among storage elements. Abbreviated SAN. A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements, and computer systems so that data transfer is secure and robust. The term SAN is usually (but not necessarily) identified with block I/O services rather than file access services.
4. A storage system consisting of storage elements, storage devices, computer systems, and/or appliances, plus all control software, communicating over a network.
Note: The SNIA definition specifically does not identify the term SAN with Fibre Channel technology. When the term SAN is used in connection with Fibre Channel technology, use of a qualified phrase such as "Fibre Channel SAN" is encouraged. According to this definition an Ethernet-based network whose primary purpose is to provide access to storage elements would be considered a SAN. SANs are sometimes also used for system interconnection in clusters.

Storage Networking Industry Association
CONTEXT [Network] [Standards] [Storage System]
An association of producers and consumers of storage networking products whose goal is to further storage networking technology and applications.

storage resource management
CONTEXT [Management]
Management of physical and logical storage resources, including storage elements, storage devices, appliances, virtual devices, disk volume and file resources.



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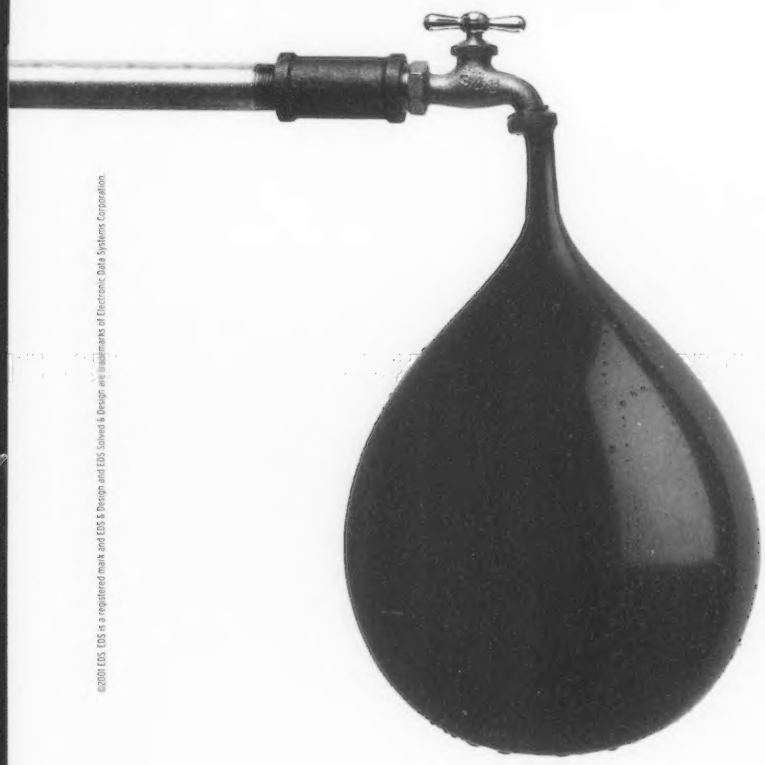

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DAVID FOOTE

Who Will Be to Blame When The Ax Falls?

THERE'S BEEN a hushed conversation going on in the upper echelons of corporate America about the problem with "mature IT workers."

Not *all* of them, though. The focus has been on obstinate long-timers who have been causing a certain amount of grief for their bosses in recent years as IT organizations have undergone radical change. Likewise targeted for extinction have been older IT workers who — at least in some executives' minds — aren't providing value to match their fat salaries as companies become increasingly obsessed with return on investment and value management.

DAVID FOOTE is managing partner and research director at Foote Partners LLC, an IT workforce management research firm and organizational development consultancy in New Canaan, Conn. Contact him at **dfoote@footepartners.com.**

It's a complicated situation that has been allowed to simmer without resolution for years. Meanwhile, the hit lists have grown longer. With the prospect of layoffs now looming large for many employers, the pot is about to boil over. It'll be a blood bath all right, but not exactly in the way you're thinking.

A recent survey of 600 Fortune 1,000 companies by Metricnet concluded that a disturbing 85% of IT organizations are unprepared to meet the challenge of being value-creating, value-producing components of their companies. That is, IT is still being managed as a cost instead of as an investment, long development times and inflexibility are common, distributed computing is growing with uncontrolled complexity and there's little or no attention paid to strategic expansion. These IT shops are stuck in the mud, spinning their wheels.

The fact is that many of the executives who are about to pull the trigger on some hapless IT workers have been doing an atrocious job preparing their companies for today's rough-and-tumble conditions. At a time when they should have been aggressively rebuilding their companies' cultures and strengthening organizational resiliency, their uninspired leadership has left their IT organizations demoralized, spiritless and poorly managed.

Dumping veteran workers for subpar performance or for failing to adapt to change speaks volumes about the companies' abject failure to teach their best employees how to continue to be good at their jobs. In contrast, successful companies invest liberally in their talent and help them grow for years.

Top IT executives will end up taking the blame for protecting "marked" employees for too long (maybe a fair charge in some cases). But make no mistake about where the accountability for this perversity rests: smack-dab at the top, with the company leadership.

In the months ahead, there will be emotional upheaval as IT warriors who fought hard in the past but were never properly equipped for the Information Age wars are bid adieu. The pessimism and general malaise that permeates many IT shops in large companies will continue.

As our economic downturn deepens, you will hear a lot about scaling back infrastructure, decommissioning systems, reducing systems capacity, disconnecting equipment, postponing upgrades and other measures intended to cut costs.

You'll hear far less about developing enterprise project management discipline, management and leadership development programs, IT investment portfolio models and other forward-thinking IT value management initiatives intended to make IT so tightly integrated with the business that there's no distinguishable difference between IT operations and business operations and between business strategy and technology strategy.

Here's hoping that as they swing their mighty axes, some of these executioners end up impaling themselves. ◗

THORNTON MAY

Open Doors To the Things Executives Know

WE, AS A SOCIETY, and you, as a part of the senior management team, need to do some hard thinking about the fundamentals of information management.

Specifically, we need to figure out what corporate information should be public and what should be private.

THORNTON MAY is a corporate futurist and chief awareness officer at Guardent Inc. in Waltham, Mass. Contact him at **thornton.may@guardent.com.**

The Dutch are way ahead of us. In the 17th century, unshaded windows entered the behavioral mainstream in the Netherlands. The back of the house, the zone of privacy, was separated from the front of the house — perhaps the first data firewall. The Dutch, ever focused on mercantile success, used the front of the house to entertain clients. The windows at the front of the house were always open. The Dutch have a word describing this balance of public and private parts of the home — *gezelligheid*. Executives need to develop a feel for informational gezelligheid.

One area where more privacy would be a great thing would be in media coverage of how executives live their private lives — how they spend time with their families, where they shop, where they play and where they worship. One of the Fourth Estate's finest moments was its sensitivity toward Franklin Roosevelt's polio while he was president.

One area where less privacy would be good is the full and timely disclosure of senior management's mental capacity and knowledge base. What the top brass knows and doesn't know should be public knowledge. In the future, knowledge auditors will test not only for fraud but also for issue ignorance. If a management team is unaware or unconnected to the best thinking on an issue, you as an investor, customer or employee have cause for concern. Today, the inner workings of key corporate minds are considered off-limits and private. This has to change.

Is it outside the bounds of believability to assume that investors, customers and constituents might, in a knowledge-base economy, actually want to know what executives know about key issues? Senior management has a fiduciary responsibility. Does it not also have a "cerebral" responsibility to know the right stuff?

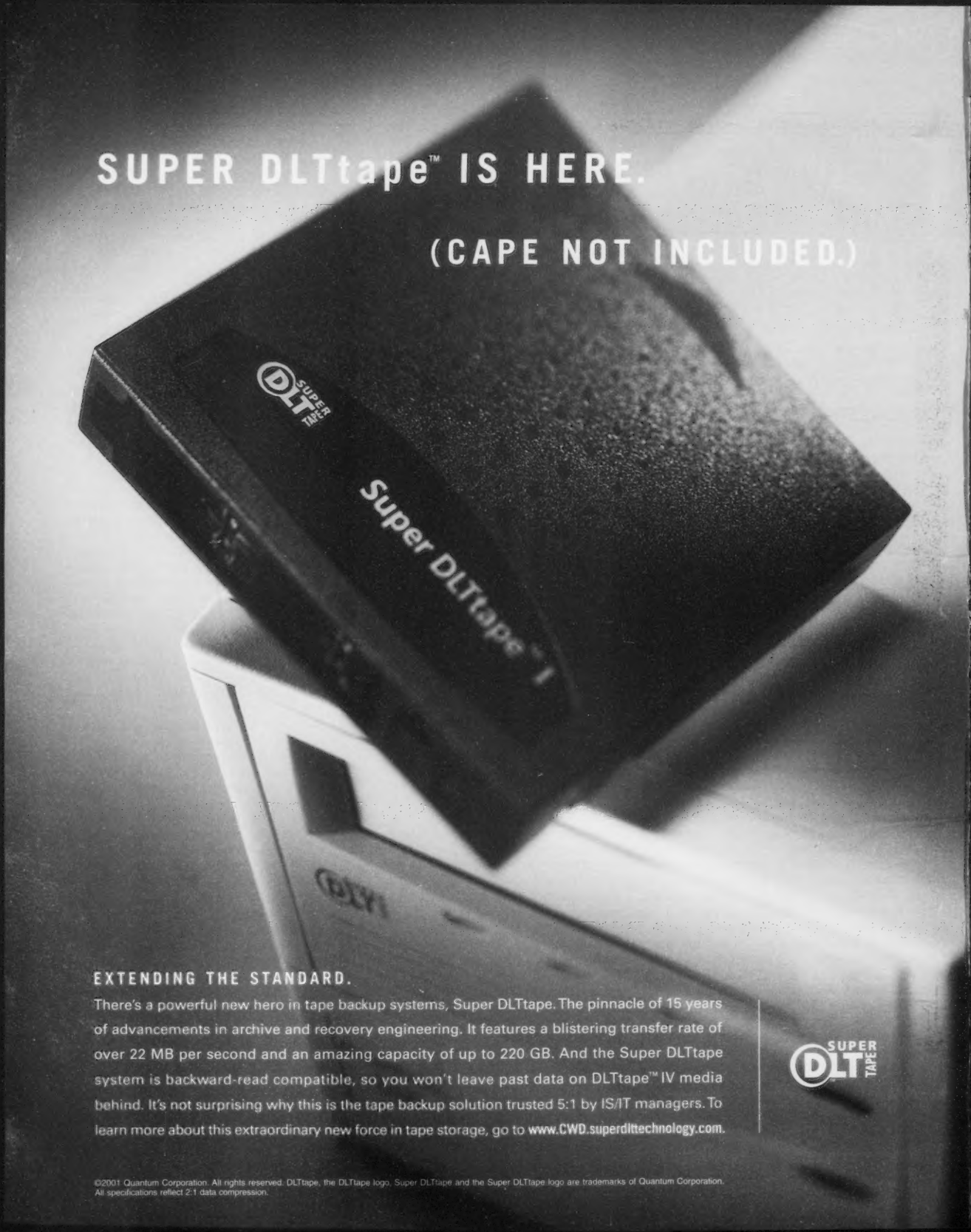
On the not-so-distant, technology-intensive horizon, our litigation-obsessed and responsibility/accountability-sensitized society will be populated with "value heroes" (executives who know how to create value with IT investments) and "value villains" (executives who don't). Villains will be sent to "value prisons," or re-education centers for the digitally challenged, for rehabilitation.

Knowledge doesn't depend so much on the where (such as the university attended) or the what (courses taken), as on the when and the whom. We've found that some of the most profound and high-value insights emerge from conversations with smart people in shared spaces. One test of senior executives might be an analysis of whom they hang out with.

Many executives haven't been involved in high-learning shared spaces for a long time. If regulators such as the Securities and Exchange Commission start requiring disclosures of what executives know about specific topics, where they learned it and from whom, you can expect several important changes, including the following:

- In the executive education industry, you'll see an increase in metrics of how executives use the information imparted to create value and more specifics regarding what's being taught and who's teaching it.
- You'll see a much more public ranking of gurus and teachers, those who own the issues of the day.
- You'll see a much more public linking of which corporations use which gurus.
- You'll see a much more public sharing of which executives are being exposed to which awareness-expanding programs.

Knowledge, what specific executives know, is going to be front and center on the radar screen. And don't be surprised to see ratings for external consultants and educators, and grades for senior executives. ◗



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Survival or Success?

DAVID JOEL

CIO JERRY MILLER, SEARS: A weak economy can present an opportunity to accelerate the development of strategic projects, like the supplier network Sears expects will save it millions of dollars. 28

BRIAN SMALE

CHRISTOPHER KENT, BOEING: Good bets in IT spending include anything that saves operational costs, including wireless LANs, consolidated purchasing apps and networks beefy enough to support internal needs and e-commerce. 30

WEBB CHAPPELL

JAMES LAPOMARDO, PICTURETEL: Cutbacks can force IT into a ruthless re-evaluation of how efficiently it aligns with the altered needs of the business. But managers must make the most of their prime asset: existing IT staffers. 32

Is it a recession or not? Economists say no. But the Nasdaq's in the tank, and dot-coms aren't the only ones laying people off. That makes IT managers wary, even though most of their budgets and projects are intact. Some worry about where to cut back or how to motivate a demoralized staff. Others see the downturn as an opportunity to fatten thin margins with cost-saving technologies or increase revenues by expanding Web-based supplier networks. Ironically, the crash could help traditional companies strike back at once-feared start-ups that are now worried more about survival than about competition.

RECESSION-PROOFING IT

Exploiting The Downt

Seasoned CIOs from companies that are sensitive to economic swings give practical advice about pursuing business improvement opportunities during tough times.

By Joanie Wexler

IT GOES WITHOUT SAYING that CIOs need to justify their IT expenditures with sound business rationale. Enterprises such as retailers and financial services companies, whose revenues are acutely sensitive to cyclical economic swings, tend to routinely apply even tighter scrutiny to their budgets than other types of businesses do.

As the U.S. and global economies continue to tighten, IT managers can learn a few lessons from veteran peers at those and other cyclical companies.

RECESSION-PROOFING IT

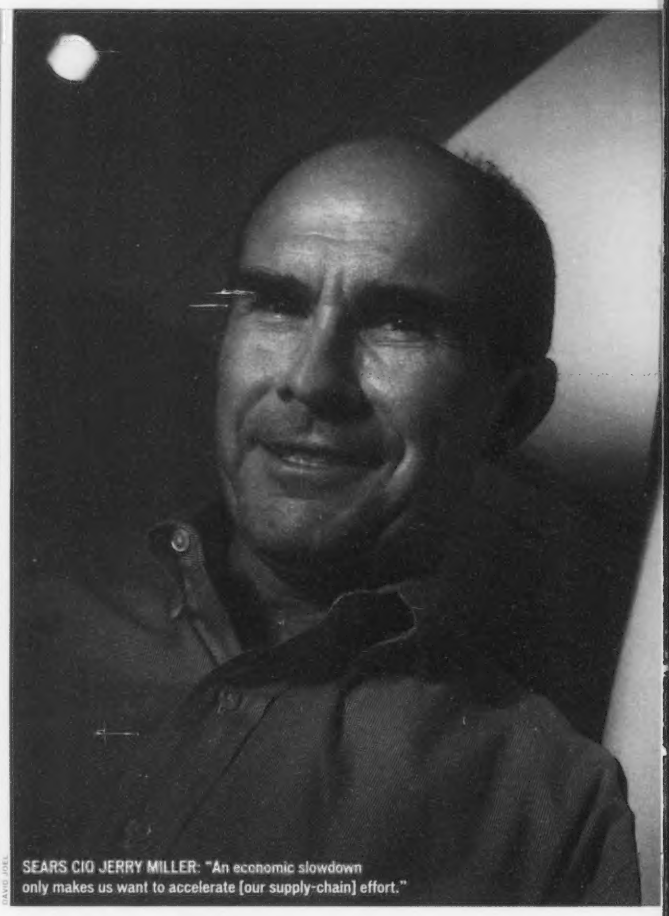
Some CIOs point out that it's important for IT executives to review spending and prioritize projects when financial belt-tightening is imminent so that their investments in IT can help businesses position themselves strategically for continued success. But skimping in the wrong areas can create further pain down the road, they say.

Many retailers, for example, are forging ahead with supply-chain management automation projects to streamline operations and cut costs. Postponing these efforts or taking shortcuts to shave costs could ultimately injure profits for merchants who typically work off razor-thin margins.

Companies with cyclical revenue sensitivities are familiar with having to cope with periods of budgetary restraint. Many large retailers are currently immersed in ramping up their use of Web technologies to help shorten their supply chains and automate their business-to-business activities. These are the kinds of projects that are likely to continue to get funding, practitioners say.

Sears Roebuck and Co. in Hoffman Estates, Ill., for one, is stepping up its efforts with the GlobalNetExchange, a business-to-business trading exchange that the company helped found for retailers with worldwide operations. The reason: The Web-based collaboration platform is expected to help Sears slash its operational costs by hundreds of millions of dollars over the next few years by streamlining the company's supply-chain activities, says Senior Vice President and CIO Jerry Miller.

"An economic slowdown only makes us want to accelerate this effort," says Miller. He says use of the exchange is expected to shorten the company's



DAVID JOEL

SEARS CIO JERRY MILLER: "An economic slowdown only makes us want to accelerate [our supply-chain] effort."

supply chain while forging stronger collaboration and communication with its product suppliers.

Many CIOs, at both cyclical and noncyclical businesses, also believe that tough times can provide IT organizations with a special opportunity to shine. The rationale is simple: Technology is often the enabler that allows companies to squeeze costs out of their operations.

"A weak economy is, ironically, an ideal time for IT to demonstrate that it can do good things" for business, says John Cross, CIO at Commerce One Inc., a Pleasanton, Calif.-based creator of electronic marketplaces and former CIO at British Petroleum PLC (BP). For instance, he says, BP weathered a recessionary hiccup in the oil and gas industry in 1990 when oil prices were about half of what they are today by forging ahead with a systems overhaul that involved a migration from a predominantly mainframe environment to client/server computing and RISC architectures. "Ultimately, the project reduced IT expenditures by about $165 million and allowed us to rewrite the cost of computing. Even in tight financial times, it remains imperative for you to seal your future," says Cross.

Seize the Day

Some savvy IT leaders see an economic downturn as a chance to seize opportunities to improve their businesses. For instance, certain types of vendors — particularly enterprise software companies concerned that businesses will postpone major upgrades or implementations during an economic malaise — are likely to get creative with their pricing strategies to win customers and meet their quarterly numbers, say some CIOs.

"You can sometimes get deals analogous to buying discounted stock in a down market," says Michael Prince, vice president and CIO at Burlington Coat Factory Warehouse Corp. in Burlington, N.J. Prince says the retailer's rule of thumb during a down period is to cut back on projects that aren't time-sensitive but to continue investing where it can get good pricing and terms.

IT business projects that improve shareholder value by generating revenue or tangibly reducing expenditures tend to make the cut during economic slowdowns, says E.P. Rogers, vice president and CIO at The MONY Group Inc., a diversified financial services firm in New York. For the competitive financial services sector, funding customer relationship management (CRM) projects is a no-brainer, says Rogers. He notes that this year's IT budget has risen 12% over last year's, primarily in the area of e-business. But the organization has broken down its IT projects into modular, 90-day deliverables so it can easily shift priorities if economic conditions warrant it.

MONY is in the process of consolidating its customer information, which is stored in different databases throughout the company, into a common CRM system that's scheduled to go live this spring, Rogers says. The system should enable customer self-service through Web-based enhancements and interactive voice response capabilities aimed at providing customers with additional means for gathering information about MONY's products and services. At the same time, the system should help reduce customer support costs.

"These things represent the price of admission" in the financial services industry, Rogers says, and aren't optional for companies that intend to survive.

When prioritizing IT projects, Cross advocates first identifying where all the costs lie in the organization and who is driving them. "Each business unit will think its own needs are paramount, and it isn't up to the CIO to arbitrate among businesses; the CEO must do it," says Cross. He suggests classifying IT expenditures, with the CEO's help, into four budgetary buckets: entrepreneurial investments, strategic investments, operational systems and support systems.

When the oil and gas market was depressed 10 years ago, "we nixed everything in the support box," which Cross describes as systems whose temporary nonavailability won't create severe company distress, such as training programs. But there's no point in attacking factory systems and payroll, he adds, because "it all must keep going for the business to stay alive."

Discretionary spending in the entrepreneurial and strategic buckets requires close scrutiny with the help of executive management, he says. "There are some investments that, if you don't make them, you could irreparably disadvantage yourself from your competitors," he says. "For example, if you're a large retailer and are not attending to supply-chain management, you're in big trouble."

What Gets Axed?

IT executives say less-strategic projects, long-term contracts with vendors and commitments to specific project completion dates are most likely to end up on the chopping block.

"We're loath to commit to strict rollout schedules for new projects," says Prince. For example, Burlington Coat is planning to upgrade to Gigabit Ethernet in its data centers to speed application response time and to reinforce the backbone as network traffic increases. "However, our current [older and slower Ethernet] network is not out of gas yet," says Prince. "This would be the kind of project that we could put on hold for a year if money gets tight."

Prince also advises postponing IT projects that don't have a clear, short-term payback. For example, he says, IT groups should consider putting off a significant application upgrade that might deliver new functionality but is otherwise costly and doesn't offer a measurable return on investment.

Rogers agrees. "When a business unit says a project will 'improve productivity,' " we ask, 'Will it eliminate positions?' If the answer is no, it doesn't get funded," he says.

CIOs agree that IT departments should rise to the occasion during periods of financial slowdowns, since they're in a prime position to help lower business costs.

"I've never taken the view that when money is tight, IT should hunker down and defend its position," says Cross. "I think that kind of attitude reaffirms old prejudices that IT doesn't understand the business." Instead, he says, "radical changes are actually easier when times are hard than when times are good." ◗

Wexler is a freelance writer in Campbell, Calif. Contact her at joanie@jwexler.com.

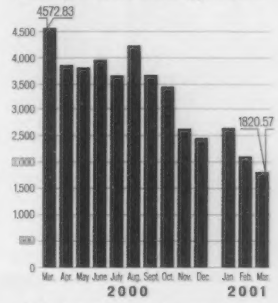
Handling Hard Times

CIOs advocate the following tactics to help their companies face an economic downturn:

1. **Uncover all costs in the business and then classify them as entrepreneurial, strategic, operational or support-oriented. Drop those in the support bucket, fully fund the operational bucket and work with executive management to pick and choose the business-critical projects.**
2. **Tap the CEO or executive steering committee to set priorities among business unit projects rather than attempt to act as arbitrator yourself.**
3. **Strike shorter-term contracts with vendors. Lighten commitments to have nonstrategic projects completed by certain dates.**
4. **If necessary, default on an outsourcing contract and ask the outsourcer to renegotiate it to bring your costs down.**

Nasdaq Dives

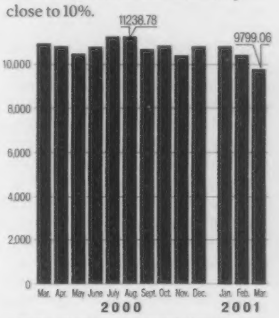
Since March 2000, the average stock price of companies on the tech-heavy Nasdaq Stock market dropped 60%.



SOURCE: CSI-DATA COLLECTION RESOURCES, EAST HARTFORD, CONN.

Dow Dips

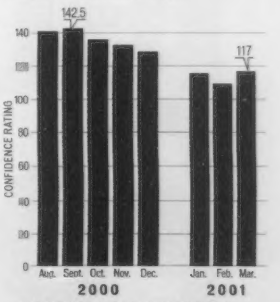
The average price of companies listed in the Dow Jones industrial average — leading brick-and-mortar companies — suffered less but still eroded by close to 10%.



SOURCE: CSI-DATA COLLECTION RESOURCES, EAST HARTFORD, CONN.

Consumers Fret

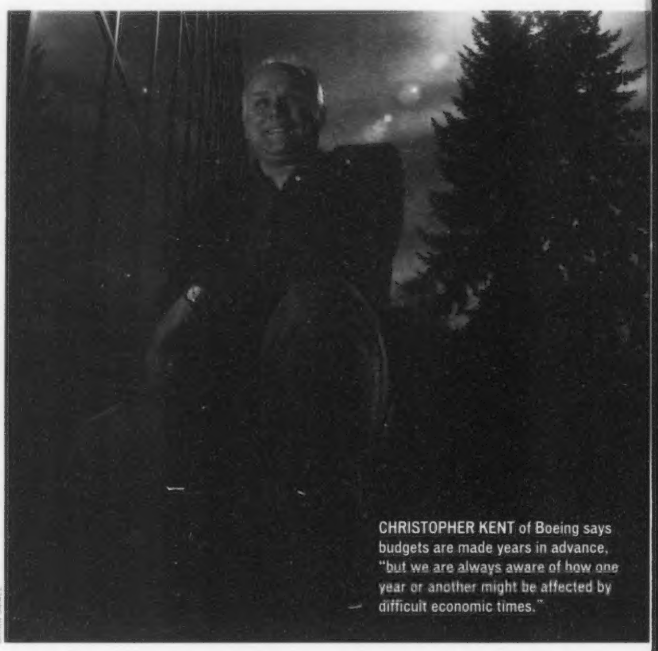
Buoyed by low interest rates and full employment, the Consumer Confidence Index bounced back in March, but buyers are still more worried than they were six months ago.



SOURCE: THE CONFERENCE BOARD, NEW YORK

Tech Choices For Tough Tin

With economic uncertainty looming, managers must choose technology investments carefully. Here are the projects that IT managers say are likely to avoid the budget ax. By Mark Hall



CHRISTOPHER KENT of Boeing says budgets are made years in advance, "but we are always aware of how one year or another might be affected by difficult economic times."

BRYAN SMALL

RECESSION-PROOFING IT

NOT EVERY IT manager has been affected by the economic travails that have ravaged the dot-com world, but the threat of a full-blown recession has everyone looking carefully at technology investments these days.

At The Boeing Co., the IT department is watching the company's technology investments with extra care, meaning capital spending for new systems will be flat compared with last year's budget.

According to Christopher Kent, Boeing's vice president of computing and network operations, "We plan two-year operating budgets and project infrastructure refresh to five years out. But we are always aware of how one year or another might be affected by difficult economic times."

So far, Seattle-based Boeing has soared above the economic turbulence. But it's reacting to the same economic warning signs other companies are seeing.

Just last month, a poll of 64 senior IT executives published by Technology Business Research Inc. in Hampton, N.H., revealed that more than one-fourth expected their spending to drop by a whopping 26% this year. And Gartner Inc. in Stamford, Conn., issued a release claiming that CIOs were "coming to the front lines to defend their operations" in the face of a lackluster economy that may slow corporate investment in IT.

Laura Bengford, executive director of international IT at New York-based Fox Entertainment Group Inc.'s international film distribution unit, says, "Call it what you may — recession or whatever — there is definitely something going on."

Despite the dire predictions, many corporate IT departments haven't yet felt the economic pinch. And it may never come, in an economy where some sectors race forward while others tumble. But mindful of the uncertain economic climate, IT managers say they'll be placing their technology bets particularly carefully in the coming year, wagering on those that deliver revenue, cost savings or improved productivity.

Top and Bottom Lines

Connectivity is one area where IT should focus its investments, because it's the foundation for e-business revenue sources, according to Linda Rossetti, president of eMaven Inc., a market research firm in Boston. And most new business opportunities will be Internet-based, she says.

That's the way Boeing sees it. The company will add to its network infrastructure this year because it's seeking more revenue from IT-dependent business services, which are primarily driven by Internet opportunities, says Boeing CIO Scott Griffin. For example, in the Boeing Commercial Airline Group, services are bolstering revenue faster than any other business is. One service alone, the Web-based Boeing Parts Page, has generated $400 million in the past 12 months.

Technology that directly cuts costs is another favorite at the $58 billion aerospace giant, which sits at No. 10 on the Fortune 500. For example, Boeing prints more than 1 billion pieces of paper every year, making it one of the world's largest publishers. Griffin says one of his business goals is to bring that number down, "ideally to zero."

Part of the strategy to reach that tar-

get is to offer browser access to legacy systems, eliminating hundreds of daily printouts generated by the profusion of legacy systems. But Boeing is currently burdened with 18 active procurement systems in its back-end operations alone. The plan is to reduce that number to four or five in the next two to three years, according to Kristina Erickson, director of venture relations for the eBuy@Boeing group.

Erickson says she hopes to reduce burdensome paperwork by leveraging Boeing's Exostar aerospace exchange. Trading on the business-to-business marketplace began last September, and it's now handling 1,000 transactions per week.

The exchange has a long way to go before it takes a serious bite out of the 12 million transactions Boeing conducted with its suppliers last year, Erickson points out. Still, the potential savings are enormous, she says, so the investment will continue, even in a slowing economy.

Some companies say that during tough times, it's important to focus on core business operations and continually make them more efficient.

For Newark Electronics, a Chicago-based electronic components distributor, running its online catalog of 150,000 SKUs is vital for business expansion. This year, with its Internet infrastructure already in place, the $600 million division of Premier Farnell PLC in London has targeted catalog management to improve its ability to update and distribute its online information.

According to Tony Chien, vice president for e-commerce at Newark, by using Cardonet Supplier catalog software from Cardonet Inc. in Santa Clara, Calif., he's been able to eliminate a full-time Oracle developer position to manage the online catalog, while increasing the frequency of updates to the 1,500-page catalog from a few times each year to weekly. Those updates generate more business for online operations and justify the investments to upper management, Chien says.

Infrastructure: Invest to Save

According to Kent, Boeing thinks putting investments in its wireless infrastructure will save money over the long haul. In the not-too-distant future, he says, the typical white-collar Boeing employee will have a laptop with a wireless LAN card installed that will let him connect anywhere on the major Boeing campuses. This will save the company millions of dollars, because the project-driven enterprise moves tens of thousands of its workers from office to office every year. Wireless LANs address most of the costs associated with relocating workers inside the company.

Boeing isn't alone in focusing on its connectivity capabilities. "We invest in areas that will increase our revenues or decrease our costs," says John Boushy, CIO at Harrah's Entertainment Inc.

One key area the Las Vegas-based company will be improving is its network infrastructure. Boushy says he's tossing out aging frame-relay and T1 connectivity for an ATM wide-area network, which he says will save the company thousands of dollars each month in telecommunications charges.

At Fox Entertainment, where Bengford says IT investment "is scaling down to basic needs," the network is also the focal point. She highlights the introduction of new routers from Cisco Systems Inc. and the upgrading of Fox's Microsoft Exchange servers to support expansion of the global network.

Even at The Motley Fool Inc. in Alexandria, Va., which recently laid off 30% of its staff, network investments continue apace. According to Kevin D.E. Book, director of IT, the online financial services site has seen a steady rise in visitors. It has more than doubled the number of site users from last year, topping 2.9 million in February. That kind of growth keeps pressure on IT to sustain high performance so users will continually return to the site.

Book says he'll be buying network file-caching servers this year from Akamai Technologies Inc. in Cambridge, Mass., to ensure a minimum response time for site visitors, bringing them to the site more often and keeping them there longer — which is considered critical to garnering the advertising dollars the site depends on for revenue.

Old-fashioned Productivity

Waving more earned or saved dollars in front of the chief financial officer will almost always win IT investments a positive response. However, making the argument for technology that improves inconsistently defined "worker productivity" often needs specific data to get approval.

Boeing uses an internal metric called lost workstation hours (LWH), which is essentially downtime caused by IT problems. Kent says that by reducing IT infrastructure outages last year, Boeing's LWH number dropped 20%. To improve on it some more, Boeing is considering a multiyear investment in storage-area networks to provide faster, easier, more reliable access to more than 150TB of data.

Kent says Boeing will also push Windows 2000 out to users during the next two years, and the company will acquire about 100,000 new PCs to run the operating system upgrade. He says he expects that with the more stable operating system, users will put fewer demands on the help desk.

Boushy says Harrah's believes investing in Microsoft Corp.'s new operating system will also be a boon to productivity. Harrah's skipped Windows 98 for company desktops but will begin Windows 2000 deployments this year, he says, adding that he anticipates that with the server management tools for Windows 2000, he'll require fewer administrators.

Boushy and Kent are both interested in improving user productivity with single sign-on security technology. But Kent, who's testing a pilot program now, says he doesn't think it will scale enough for his organization. Boushy says the technology is barely more than one year away from being real, "but the productivity and security advantages are too obvious to ignore."

Technology investments aren't recession-proof, but they can be recession-resistant. IT executives should not only focus on their traditional role of identifying technologies that will save the company money or improve productivity through automation, but they should also choose technologies that can help generate revenue.

"When the belt gets tight, you look at the must-haves and the nice-to-haves and choose the former," says Book.

Technology Criteria for Lean Times

1 **Invest in technology projects that generate revenue. Boeing's Web-based Boeing Parts Page has generated $400 million for the company in the past year.**

2 **Speed deployment of technology that saves money. Harrah's expects its replacement of old WAN links with a new ATM network to reduce network costs by thousands of dollars each month.**

3 **Focus on technologies that improve productivity. Newark Electronics' new Web catalog management tool lets the company manage its online catalog with fewer staff while allowing more frequent updates to its 1,500-page catalog.**

No Techie Decline

The number of IT employees in the U.S. hasn't yet declined, according to the latest figures available.

SOURCE: MORGAN STANLEY DEAN WITTER RESEARCH, NEW YORK; U.S. COMMERCE DEPARTMENT; INFORMATION TECHNOLOGY ASSOCIATION OF AMERICA, ARLINGTON, VA.

Dot-Com Layoffs

But layoffs in the U.S. are three times what they were a year ago, according to Chicago-based outplacement agency Challenger, Gray & Christmas Inc.

TOTAL LAYOFFS

Dec. '00 - Feb. '01	Dec. '99 - Feb. '00
377,652	130,752

INTERNET FIRM LAYOFFS

Dec. '00 - Feb. '01: 34,936

The Better Part of Valor

Most of the 150 CIOs surveyed by New York-based Morgan Stanley Dean Witter & Co. said they aren't treating the economy like a crisis yet, but they're being very cautious.

14% said they would spend cautiously during the first half of 2001 to monitor the economy.

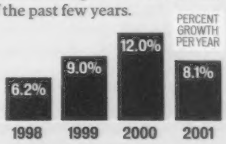
3% have scaled back their budgets because of economic concerns.

9% have scaled back IT due to market conditions.

74% haven't changed their plans based on changes in the economy.

Global IT Budget Growth

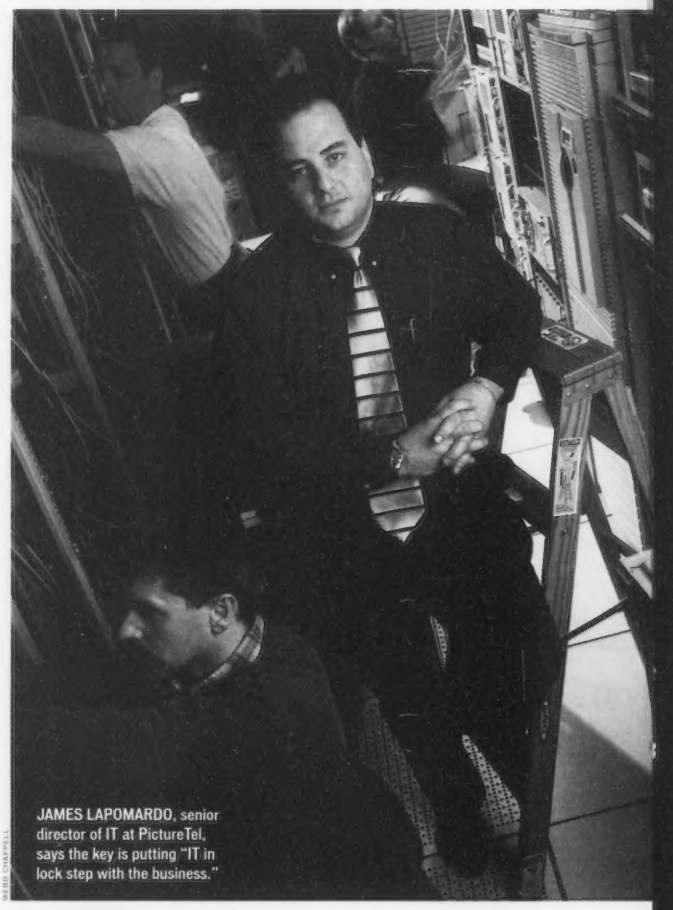
IT budgets are still increasing, and pretty generously, but they clearly crested during the Internet mania of the past few years.



SOURCE: MORGAN STANLEY DEAN WITTER RESEARCH; U.S. COMMERCE DEPARTMENT

Can't L Witho

Faced with declining budgets, companies must cut duplication and inefficiency. The key to keeping your job is to prove your value to the bottom line and business strategy. By Sacha Cohen



JAMES LAPOMARDO, senior director of IT at PictureTel, says the key is putting "IT in lock step with the business."

WEBB CHAPPELL

RECESSION-PROOFING IT

WHETHER IT'S A correction, a slowdown or a full-fledged recession, one thing is certain: The economic outlook is anything but rosy. And even though no one wants to talk about it, the slowing economy is affecting everyone, even IT managers and their staffs.

True, IT budgets are often the last to be trimmed. Research from Stamford, Conn.-based Meta Group Inc. indicates that IT budgets will continue to increase this year, just not as fast as before. Budgets that have been growing by about 8% to 10% annually might grow 5% this year. Even so, it can't hurt to prepare for the worst.

Business Alignment

James Lapomardo, senior director of IT at PictureTel Corp., a manufacturer of videoconferencing systems in Andover, Mass., says he has mixed feelings about the cooling economy and the impact it's having on IT.

His company isn't suffering like other technology companies, particularly dot-coms. Many high-tech companies in Greater Boston, which is the No. 2 high-tech market in the country, have been hurt by the downturn.

Nonetheless, Lapomardo has definite thoughts on what IT workers should be doing to weather any rough seas ahead. He points to the example at his own IT organization, which has experienced dramatic reduction.

In the past nine months, Lapomardo's staff has gotten leaner and more efficient, dropping from 65 to 40 employees due in part to a centralization of IT functions and elimination of IT overlapping director-level positions.

IT was centralized for several reasons, but the primary one, according to Lapomardo, "was to gain back certain synergies from what used to be a centralized IT organization."

During the consolidation, the IT department found several overlapping areas such as duplicate hosting agreements, similar support contracts and duplication of job responsibilities. Much of the overlap was eliminated through attrition.

The key, explains Lapomardo, was putting "IT in lock step with the business." He recommends realigning IT with the business by asking questions such as, "What are your company's current strategic goals?"

"Strategy is ever-changing, and what is right in one cycle is certain death in another," Lapomardo says.

Once you've done that, it's essential to evaluate your current IT staff as it relates to the business strategy. Do you have the right team in place, or have you amassed certain legacy skills that can't make the leap to the new priorities? Are you willing to outsource?

Although Lapomardo's employees have top-notch technical skills, he says some of them needed to work on their business skills. For example, Lapomardo is helping a client manager with a strong technical background transition into a more client-services-oriented role, where he serves as the liaison between IT and business.

"I've been working with him to hone his client-management skills because he already has the technical skills," Lapomardo says.

"Staff alignment comes only through analysis of what the end result has to be," he says. For example, he explains, if you intend to base a better part of your strategy on e-commerce, determine what skills you need and whether the work is to be done in-house or outsourced to an application service provider. "Be prepared for both, since the financial case may make the decision an easy one," says Lapomardo.

Jerry Carlsen, CIO at Friedman, Billings, Ramsey Group Inc. (FBR), a financial services firm in Arlington, Va., says to avoid budget and staff cuts, IT departments must align their activities and projects with the revenue side and the overall business plan.

"In fact, [if] activities [aren't] directly or indirectly linked to revenue generation, revenue enabling or, at a minimum, expense reducing, the activity should not be pursued. The exception to this is required infrastructure im-

provements and activity required for daily operation," Carlsen says.

When Carlsen joined FBR, he met with all his employees individually and then built a matrix to measure staff against various criteria, including customer interaction skills, technical skills, project management skills, team orientation and willingness to learn. He then aligned his staff with business initiatives such as revenue targets for different business lines.

"This direction then needs to be communicated to all IT staff, as everyone needs to be moving in the same direction to be truly effective," Carlsen explains.

Retrain, Reprioritize, Reduce

Carlsen says he has yet to feel the impact of a cooling economy. But if his team encounters rough times, it will be prepared as a result of that focus and business alignment exercise.

This also means implementing team dynamics and exploiting "more of a project-and-results focus to drive compensation." Everyone in IT at FBR will be measured on results, notes Carlsen.

"Teamwork and focus are the first two critical elements to building a more highly skilled organization," he says. "There may be group managers, but the people working for them may be working on various different projects at a given time. This builds a more highly skilled organization.

"The [next] is implementing project management disciplines," Carlsen adds. "This is how I'm preparing for leaner times, putting together teams and disbanding teams as needed."

Leveraging the staff you have might mean training, reprioritizing or eliminating obsolete tasks altogether. However, Carlsen cautions against asking someone to do something for which he isn't qualified.

"Either retrain someone who you know can make the leap to the new role, or recruit the right person for the job," and keep your specialized jobs specialized, he says.

"If you have an Oracle [database administrator], don't ask them to do NT administration just to get the most out of them," Lapomardo says. "There are always going to be jobs you cannot combine or make any more efficient. If you have someone who you feel is not being fully utilized, maybe that job can be contracted or outsourced, since it may not be a full-time responsibility."

On the other hand, Carlsen warns that relying too heavily on employees with specialized skills is a recipe for disaster. "Don't rely on one person knowing a job," he says. "Cross-training is crucial. Primarily, people are in training classes that give them greater breadth of information. Now, instead of having one person that knows all about network engineering or security issues, there are several. This also adds a learning element to the job that keeps IT people engaged."

Then, Carlsen says, go for quality over quantity. "A 12-person team can be as effective as a 22-person team if the right individuals are on that team."

At the United Negro College Fund in Fairfax, Va., CIO Vida Durant knows all about doing more with less. She says tight budgets and limited resources are de rigueur — slowing economy or not. If anything, recent layoffs are expanding the pool of job candidates that Durant and other IT managers at nonprofits can choose from.

"In a nonprofit, you have a social mission," says Durant, "so your whole goal is to minimize operating expenses." Sometimes, this means investing in technology such as desktop video conferencing to cut down on travel expenses or implementing customer relationship management systems to enhance efficiency.

Other times, it means making do with fewer full-time staffers and hiring consultants as needed. And Durant says everyone who works for her has to be able to perform multiple tasks. "They are normally responsible for two or three different areas," she says.

Training Isn't Optional

Most of the IT managers interviewed for this article agreed that training is one of the best ways to stretch staffing resources.

"I don't think the issue is keeping training costs down as much as it is 'What training can be done to make IT departments recession-proof?' " says Susan J. Goldberg, president of Northeast Training Group Inc. (NTGI), an IT training consultancy in Chestnut Hill, Mass. "Any training that allows people to focus on systems that reduce cost helps to make them recession-proof. When business and the economy are down, it is important for IT to have shorter delivery cycles."

Training in practical applications such as rapid application development and cost/benefit analysis will help IT in a down economy, says Goldberg.

Training is a great incentive and morale booster for star employees, says Lapomardo.

"No, you can't be reckless in your spending, but you can make training available to those individuals that you know will benefit the corporation by training them," Lapomardo says.

"Too many times we train people to keep them happy, when in the long run they end up putting it on their résumé to get their next job. Make training something that people earn because they have shown a good work ethic, enthusiasm and provided real value to the organization."

Although training is important, it shouldn't be used to retain employees who don't want to be there in the first place. "You shouldn't adopt a 'pay-to-stay' policy," says Lapomardo. "Engage people who want to be there and provide value to the corporation."

Carlsen uses training to get the most from his staffing budget. "We want to retain our best people, and one way to do that is to provide aggressively for professional development," he says.

Always on the lookout for cost-saving measures, Durant says she keeps her training budget manageable by taking advantage of online training opportunities. She uses training offered by NTGI and local training providers whenever possible to keep travel expenses at a minimum.

Some IT managers and staffing experts agree that the slowing economy may have a positive outcome in the long run.

Candi Dalipe, a principal at Philadelphia-based Banister International, says that because of the slowdown, IT managers are able to do without people who weren't as skilled as the manager would have liked but "were brought on because they needed bodies."

Dalipe says IT managers who are trying to keep employees positive and improve morale in these uncertain times should encourage employees to proactively seek ways where IT can assist in driving down costs.

Dalipe also recommends that IT managers be as upfront as possible about potential layoffs. "That way, employees don't feel like they are in the dark and are always waiting for the ax to fall," she says. "It is critical that managers have an open-door policy so that employees feel like they can address concerns, especially if the company has had recent layoffs." ◗

Cohen is a freelance writer in Washington.

How to Protect Your IT Career

Worried about the longevity of your job? Here are five tips to help IT professionals and others stay employed during tough times.

1. **Consider becoming a contractor. Having multiple clients – especially if they are in different sectors – can make you less susceptible to layoffs and closings.**
2. **Align your skills with the business strategy. If your organization has announced a new e-commerce initiative or is scaling back its Web presence, be aware of how that will affect you.**
3. **Be flexible and willing to multitask. Willingness to take on new responsibilities and learn new tasks will ensure job stability.**
4. **Always be learning. Make sure your skills are up-to-date. If your organization offers training, take it. Consider signing up for training on your own time as a way to recession-proof your career.**
5. **Become indispensable. Would your department be lost without you, or would your co-workers barely notice your absence? Work toward the former and you'll never have to worry about pink slips.**

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POINT OF VIEW

Agility

As applied to the computer industry, the concept of agility takes on a new meaning. Working together, Compaq and Microsoft are constantly striving to embody that concept.
www.windows2000advantage.com/pov/03-19-01_agility.asp

TECH EDGE

Visual Studio.NET A platform for Web application development

The Microsoft .NET initiative is rapidly taking shape with the growing availability of solid services riding on top of Microsoft Windows 2000.
www.windows2000advantage.com/tech_edge/03-12-01_visual_studio.asp

Q & A

Compaq server exec reviews market trends

Hugh Jenkins, director of marketing for Compaq s Industry Standard Server Group, discusses what users expect from their servers and how evolving server technology is empowering them.
www.windows2000advantage.com/qa/03-05-01_market_trends.asp

COLUMNS

Windows XP, a.k.a. Whistler, impresses our reviewer

the recently unveiled Windows XP, which embodies the client-side version of the enhanced Microsoft Windows 2000 version known as Whistler, offers stability, power, flexibility and extensibility.
www.windows2000advantage.com/columns/02-26-01_win_xp.asp

CASE STUDIES

RadioShack, Starbucks blazing Commerce Server 2000 trail

Before Microsoft s Commerce Server 2000 hit the street, it went through an extended beta testing trial with top-tier companies. Two of them, RadioShack.com and Starbucks used it to accomplish specific e-commerce goals.
www.windows2000advantage.com/case_studies/01-22-01_commerce.asp

COLUMNS >

Defining enterprise class: Is Windows 2000 ready?

Many different elements comprise true enterprise class computing. In order to determine if Microsoft Windows 2000 fits this elusive bill, Aberdeen Group s Tom Manter, takes a detailed look at Microsoft s efforts to distinguish Windows 2000 among its operating system peers.

For the full story, visit: www.windows2000advantage.com/columns/04-02-01_enterprise_class.asp

NEWS >

Windows XP Beta 2, Tablet PC, wireless support headline WinHEC

Recently, Microsoft held its 10th annual Windows Hardware Engineering Conference (WinHEC) in Anaheim, Calif. The main themes surrounding the conference revolved around the availability of Microsoft Windows XP Beta 2, a new device still in development called the Tablet PC and wireless technology.

For the full story, visit: www.windows2000advantage.com/news/04-02-01_xp_beta2.asp

NEWS >

Whistler Beta 2 set for wide-scale scrutiny

With the release of the Whistler Beta 2 server family, Microsoft set in motion one of the largest and most ambitious software testing programs in its history. Nearly 300,000 customers, partners, OEMs, developers and other testers will have access to this new server operating system software.

For the full story, visit: www.windows2000advantage.com/news/04-02-01_whistler_beta2.asp

www.Windows2000Advantage.com/300

ROUNDTABLE >

Hardware, application compatibility are critical Windows 2000 planning and implementing issues

The Stride Rite Corp., based in Lexington, Mass. has devoted to keeping in step with the times for over 80 years. In addition to its children s shoe line, Stride Rite makes Sperry Top-Sider, Keds, Nine West and Tommy Hilfiger footwear. With annual revenues of $573 million at the end of 1999, the company competes in a rugged retail environment where performance and speed-to-market dominate business and technical efforts.

Recently, Stride Rite migrated to Microsoft s Windows 2000 platform. The company teamed up with Microsoft Consulting Services and Microsoft Certified Solution Provider Getronics Inc. to roll out Windows 2000 as a replacement for a dated Novell Inc. environment.

Strategic IT goals at Stride Rite included a network environment based on Internet standards and protocols in order to eliminate protocols such as IPX. The company also wanted a unified architecture for both desktop and mobile clients with Windows 2000 policy-based management. It further wanted a Windows 2000-based application development environment that would give it the ability to take advantage of Windows DNA 2000. Windows DNA 2000 combines back-end systems, client systems, and applications that work seamlessly with each other and the Internet.

As with many companies, our network department had changed hands multiple times, says Joe Attardo, Stride Rite Corp s Senior Network Analyst. By migrating to Windows 2000, it allowed us to come as close to starting over with our network as possible and to regain control over our infrastructure.

One important aspect to gaining control of the IT environment for Stride Rite and other organizations is evaluating hardware readiness and application compatibility when migrating to Windows 2000 as a global business platform. Planning prior to volume deployment is essential, says Steve Brown, Microsoft Windows Marketing unit manager.

For the full story, visit: www.windows2000advantage.com/roundtables/02-12-01_users.asp

QUOTE OF THE WEEK >

"With Windows 2000, Microsoft designed in new features that help overcome the greatest cause of system failures – namely software conflicts."

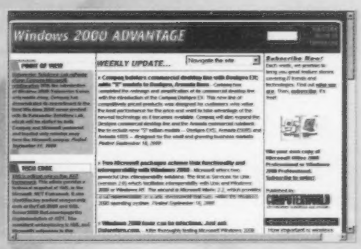
— Tom Manter
research director
The Aberdeen Group

What is Windows 2000 Advantage?

The mission of Windows 2000 Advantage is to become your primary source of timely, useful information for planning and implementing Microsoft Windows 2000 on Compaq solutions and services.

Windows 2000 Advantage is a Web-only magazine because that lets us bring you, the IT leader, great stories that apply to your day-to-day work. We lkeep you up to date with a weekly e-mail alert so you don tmiss a thing.

Windows 2000 Advantage is underwritten by Microsoft and Compaq. Its charter is to address the issues that most concern IT managers charged with keeping their companies on top of the latest and best solutions Microsoft and Compaq have to offer. Toward that goal, we offer a wide range of stories including case studies, columns and news to provide you with information you can tfind anywhere else.



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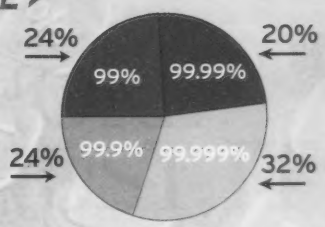

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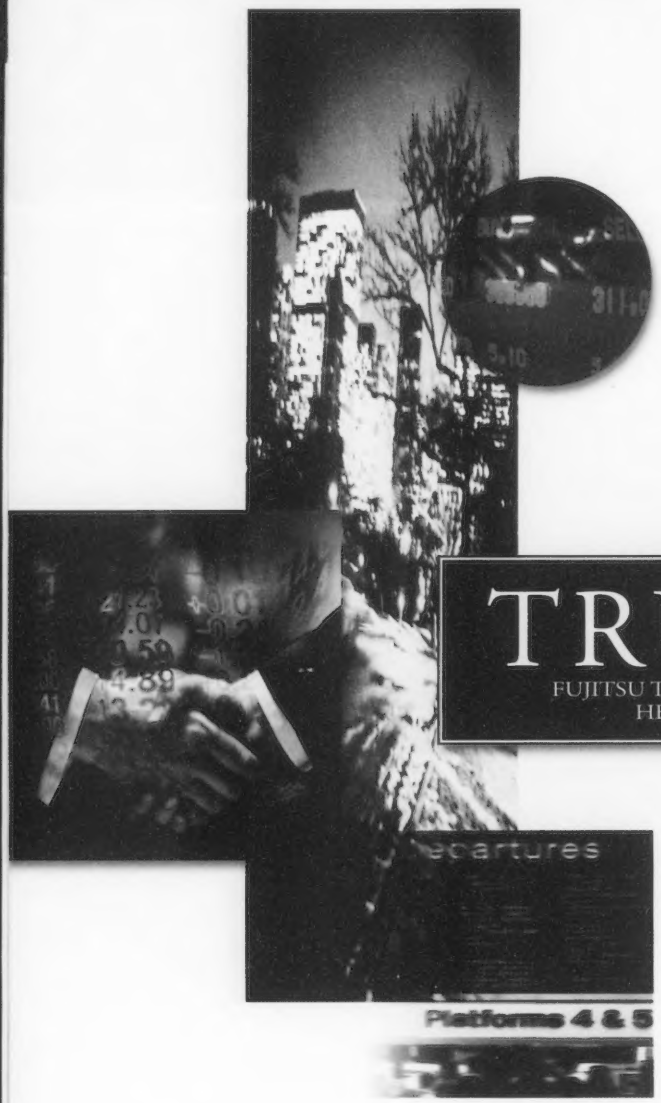

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BUSINESS

SERVICE AUTOMATION

Business automation software can pay off for midsize firms that need to bill more promptly and streamline their business processes — but not for professional services firms, whose processes have been too idiosyncratic. Users say new software might change that and help bring services companies up to speed. ▸ 40

HOW MUCH IS IT WORTH?

Paul Strassmann writes that U.S. businesses are spending too much money on IT, which dwarfs other types of spending. IT spending will be sluggish until managers more clearly prove its worth, he predicts. ▸ 41

MOTIVATE ME

It takes more than an annual bonus or raise to keep IT workers going during tough economic times, says motivation specialist Craig Muller. What's needed are carefully targeted awards and the ability to turn around staffers with bad attitudes, he advises. ▸ 41

E-PAYMENTS

Automated Clearing Houses — secure private networks that let financial institutions process electronic payments — are moving to the Internet. They're adding capabilities to let merchants take advantage of transactions that could save vast amounts of time and money. ▸ 44

"WE NOTICED A NEED to beef up leadership development within IT," says John Madigan, vice president of IT human resources at The Hartford Financial Services Group.

ANY ETRA

LEARNING MORE THAN JUST IT

CORPORATE TRAINING IS MOVING UPSCALE as more companies see a benefit in adding leadership and executive education to their more mainstream curricula. Companies that use the training programs, which depend on technology to teach budding executives, see immediate payback in training IT managers how to motivate the troops and how to keep innovating in areas that will directly benefit the bottom line.

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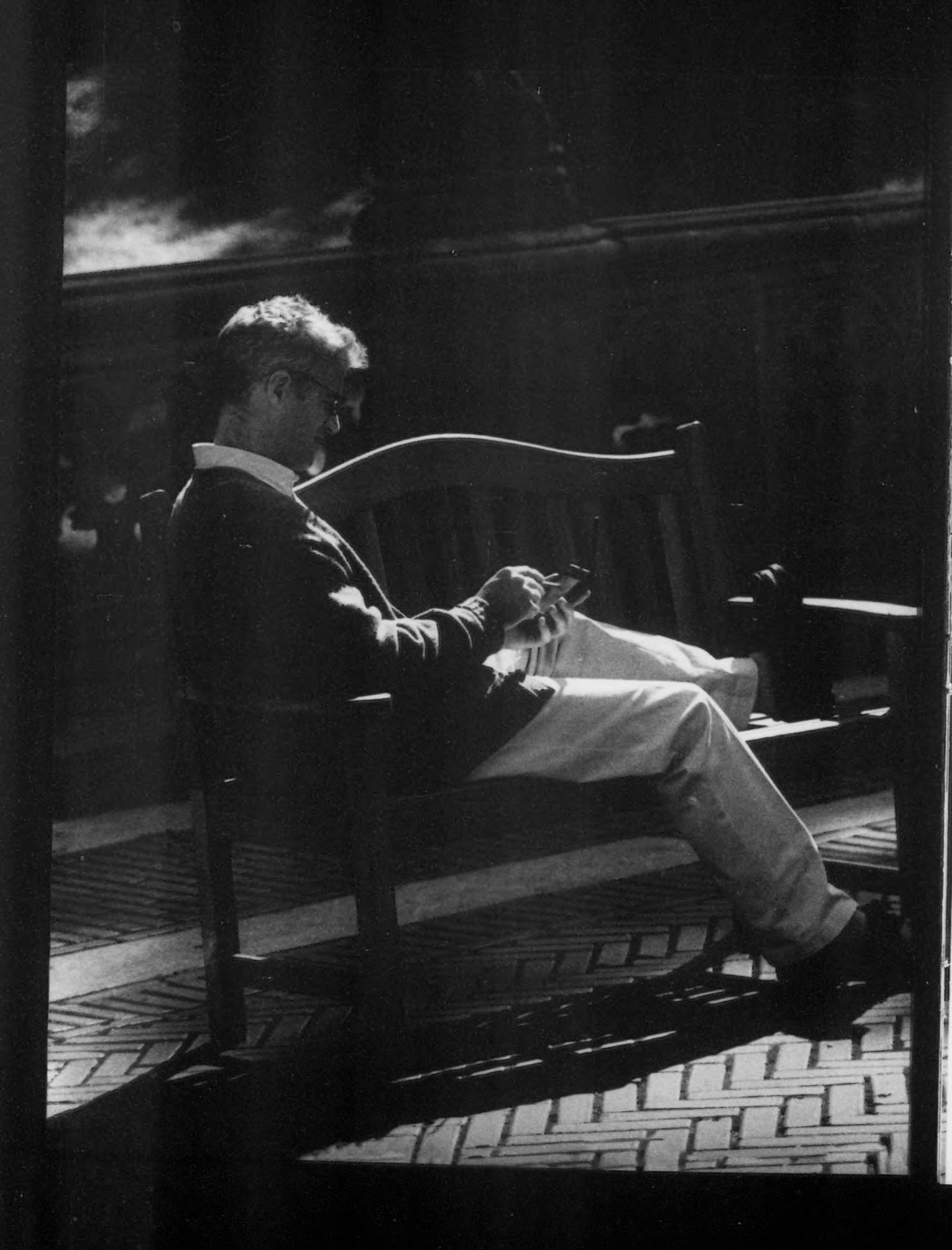

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Automation Helps Services Firms, Despite Obstacles

BY MARC L. SONGINI

Like IT executives at other services-related companies, advertising agency CIO Mitchell Dickerman said automating his firm's business processes is paying off in cost savings and improved efficiency — but not without some obstacles.

For the past two years, Dickerman has been overseeing a rollout of billing and expense applications from Pleasanton, Calif.-based PeopleSoft Inc. at Hill, Holliday, Connors, Cosmopulos Inc. Installing the software at a firm that's "not at the cutting edge of technology" has been challenging, he said, adding that he's cautious about giving workers too much automation.

But Boston-based Hill, Holliday decided it needed more timely billing information to better track employee productivity and to ensure more rapid payments by its customers. Dickerman opted to go with Surebridge Inc., an application service provider in Lexington, Mass., that has customized PeopleSoft's software to work with the advertising agency's back-end systems.

The billing system went live a year ago. Dickerman said there have been clear benefits, such as users' ability to enter data directly from Web browser clients into the agency's finance systems. "For the first time, there were no missing time sheets," he said.

Hill, Holliday is also collecting thousands of dollars in fees that previously would have gone unpaid because of late or overlooked billing slips, Dickerman said. Next up is an expense entry system, now in beta testing, that should allow users at the 1,000-employee agency to fill out Web-based forms that connect expenses to specific projects and clients.

An increasing number of IT managers in industries such as advertising, telecommunications, law, health care and construction are turning to software that fits within the category of professional services automation (PSA). Such applications could help "almost any service-based organization interested in improving [its] business processes," said Ted Kempf, an analyst at Gartner Inc. in Stamford, Conn.

Another PSA adopter is Integris Health Inc., a nonprofit health care system in Oklahoma City that went live last August with PSA software developed by Changepoint Corp. in Richmond Hill, Ontario. The software lets managers track projects and handle scheduling and invoicing without adding administrative costs, said Integris CIO Avery Cloud.

"We're able to better streamline work processes and collaboration," Cloud said. The PSA software also gives Integris improved capabilities for forecasting how many workers will be needed at a given time, he added.

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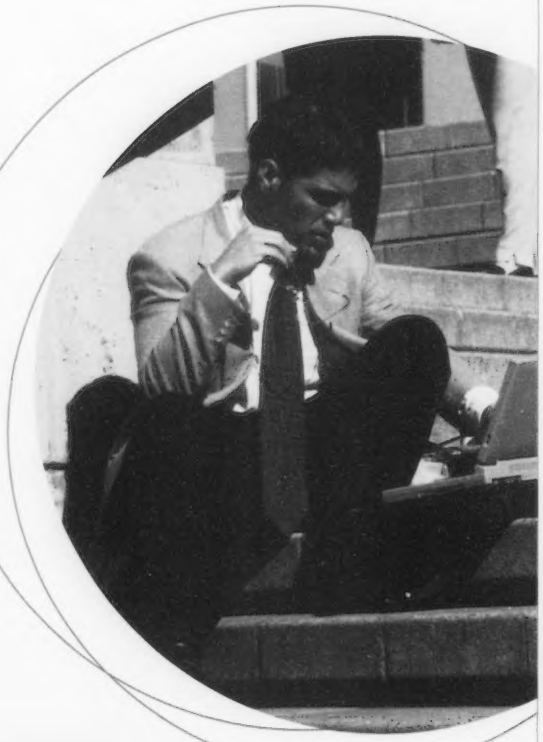

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WORKSTYLES

Keeping Workers Revved Up During Tough Financial Times

Craig Muller is a third-generation motivator. His father and his grandfather both devoted their careers to devising incentives to get consumers to not only buy from corporations but to also get excited about buying from them.

Now Muller has put a 21st-century spin on the old family business as founder of San Francisco-based MyPoints.com Inc. and Mount Prospect, Ill.-based CultureWorx.

MULLER: "Without feedback, you're dead in the water."

Consumers who view ads through MyPoints.com collect points that can be redeemed for merchandise at participating retailers. Corporations that sign on with CultureWorx can reward employees who meet certain criteria (for instance, help desk employees who remember to thank callers) with points redeemable for merchandise.

In a recent interview with *Computerworld*'s Melissa Solomon, Muller offered advice on how employers can motivate workers despite the layoffs and sinking profits that are crippling IT departments nationwide.

What are the keys to motivating employees? Most companies look at what happens before the behavior. . . . We tell [employees] what to do; we send them an e-mail; we send them a longer e-mail; we shout a little louder. All that does is get the behavior started. It will cause a one-time occurrence of behavior.

But the opportunity we really have is to look at what happens after a behavior – what behavior scientists call the consequence. The more positive it is, the more immediate it is and the more certain that the consequence is there, the more likelihood you have of the behavior repeating or sustaining itself.

What are some of the common mistakes people make when trying to motivate employees? Always trying to use compensation in the form of bonuses at the end of the year, because we experience the same kind of motivation when we try to diet. The impact is so far away from the activity or the behavior in terms of timing that it's real hard for us to realize the value of being on a diet.

How can you turn around someone who's bent on being cynical? The best way to do it is, don't react to the sour attitude. . . . When you first stop reacting to his behavior, he actually will act out more, but eventually, he will stop. The behavior will become extinct because he's not getting any feedback that causes him to continue the behavior. Then, the best way to get a change is . . . as soon as you catch him doing something right, you have to [praise him].

All behavior is consequence-based. And if you want to make a good behavior extinct, you can do that, too, by not reacting to him. So if you never give him any incentive or never pat him on the back or never give him any feedback, this is how good employees turn bad. You ignore them because you think, "I don't have to do anything about them; they're doing the job right." Without feedback, you're dead in the water. That behavior will become extinct.

How can you keep people motivated in tough times like these? Employees need to be more motivated than ever, because there's a latent potential that's there that has to pick up for the people that are being laid off. . . . It's really about . . . getting people to do what you want them to do because they want to do it, not because you're telling them do it.

How do you do that? Companies should have another purpose that employees should be involved in that gives the company a culture. We work with orphans in our company. When [workers] see their company is involved in some sort of socially redeeming effort, it lets them know that they care not only just about the bottom line, but they care about the people.

PAUL A. STRASSMANN

A Growing Bubble

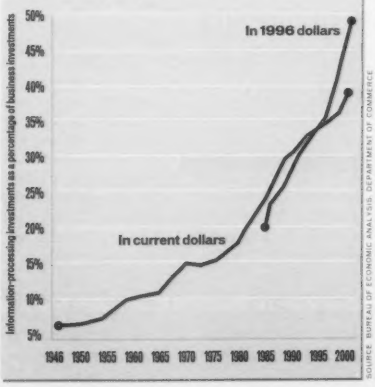
THE FEDERAL GOVERNMENT SAYS U.S. businesses devoted 47% of all capital investment funds last year, or $664 billion, to IT. That percentage is twice what it was in 1991. If that growth rate continues, IT will overwhelm all other investment needs and diminish the availability of funds needed to cope with, say, a possible energy crisis or increased global competition.

Last year, capital spending for hardware alone exceeded investments made in every other major economic sector. This implies that IT was seen as offering an appropriate investment response to Y2k paranoia and Internet hysteria, as well as meeting the needs of a rapidly expanding economy. But IT investments don't yet account for the full costs of installing and maintaining IT. Each dollar of capital investment in IT requires at least another $2 to $3 in labor costs to maintain it. This amounts to a total IT budget last year of about $1.7 trillion, twice the total of all profits, and it's growing at more than 20% per year. That's four times faster than the recent rise in the gross domestic product.

Is this sensible? Is an economy competitive when it devotes almost half of its investments and twice its profits to IT? How much more information does the U.S. need to prosper? When the U.S. emerges from its current downturn, will recent growth patterns reappear? To answer these questions, let's examine the history of IT's share of business investments:

Capital Spending on IT

Capital investments in IT as a percentage of all business capital investments have increased during the past 50 years, but the federal government says those investments have been most pronounced during the past decade.



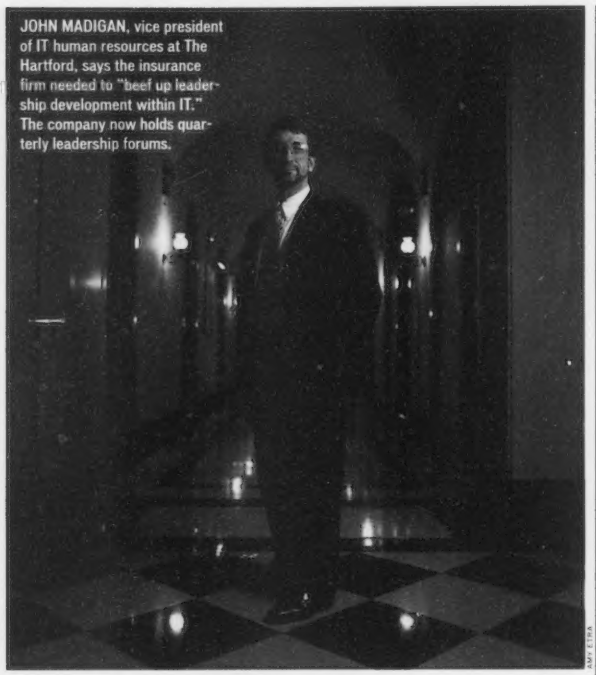
The blue line on the chart below represents actual spending in current dollars. But the agency that released the figures, the Commerce Department's Bureau of Economic Analysis, finds that current dollars are inapplicable for making historical comparisons because IT has been gaining in value over all other investments [Business Opinion, Jan. 8]. Therefore, the government sets a higher value for IT, shown by the red line.

Even if IT budgets were to maintain the same share of investment funds as they did last year, the value of computing relative to everything else would keep exploding. The economy would be plowing its capital surpluses to keep expending its information-processing power. That would dwarf the worth of every other capital investment such as real estate, transportation equipment and energy exploration. Doing so would leave a steadily diminishing supply of capital funds to finance a growing list of international and domestic economic challenges.

How much excess spending can be attributed to this recent IT capital investment bubble? Based on the 1996 rate of 31.9% for IT's share of all investments, total IT capital spending for the five years through 2000 would have been only $1.8 trillion, compared with actual spending of $2.3 trillion, making the IT investment excess worth about $500 billion. That money is sorely needed now as revenues and profits fall.

What's a reasonable prognosis on the future of IT investments? Just examine the blue line showing the rise of IT's share from 7% in 1946 to 39% last year. The growth comes in spurts, reflecting repeated cycles of "build-and-scrap" investments. As long as each successive cycle was affordable, it was prudent to discard old systems. But those days are over. We have reached a stage where the dismantling of client/server and enterprise systems is taking place even before they're fully installed. In the next few years, the prospects of an IT investment pace comparable to anything that has occurred during the past five years is unlikely. Spending will remain sluggish until IT payoffs become more attractive than those of other investments. ◗

Strassmann (paul@strassmann.com) continues to study the economics of IT to make more realistic assessments about its future.



JOHN MADIGAN, vice president of IT human resources at The Hartford, says the insurance firm needed to "beef up leadership development within IT." The company now holds quarterly leadership forums.

New Roles For Corporate Universities

No longer targeted at just junior and middle managers, corporate university programs now train IT executives and help others achieve their leadership potential. By Jill Vitiello

ONLY TWO DAYS into her new job as director of finance for the enterprise technology services unit at The Hartford Financial Services Group Inc. in Hartford, Conn., Mary Tiberti was already tackling the critical task of developing leadership skills.

Tiberti was invited to attend the company's first IT leadership forum. Although she had prior management experience, she says, she was interested in hearing The Hartford's perspective on how to "grow" or groom IT leaders.

The forum gave IT managers tools to attract and retain top talent based on motivating people rather than trying to make them happy. Although Tiberti says she considered the forum valuable, she never expected it to be the catalyst for The Hartford's virtual corporate university, which has helped her and her 30 staff members increase their knowledge base and advance their careers.

"The leadership forums are a great way to network with peers, hear about Hartford's strategic concepts and fit our individual responsibilities into the framework of the organization's goals," says Tiberti.

During the past 20 years, corporate universities have migrated away from the ivy-covered academic institutions they emulated. Today, they more often consist of a partnership formed between an IT department and a local college to offer online training and distance learning companywide.

"A corporate university is the strategic management of a company's learning function, generally led by a chief learning officer," says Jeanne Meister, president of Corporate University Xchange Inc., a consulting firm in New York that specializes in corporate university management.

Traditionally, most corporate universities have concentrated their curricula on training junior and midlevel employees. However, a recent trend toward in-house executive education has led some companies to include a new emphasis on leadership development in their programs.

At The Hartford, "we noticed a need to beef up leadership development within IT," says John Madigan, vice president of IT human resources. "Studies show that managers have an important role in people leaving or staying with a company."

In 1999, the insurance firm held a one-day conference for its 350-member IT leadership team to teach the skills for improving retention. It was so successful that The Hartford now runs the IT leadership forums every quarter.

Learning Leadership

At The Boeing Co. in Seattle, leadership education is delivered in a variety of ways, according to Jan Wilmott, director of executive learning programs at Boeing's 2-year-old Leadership Center in St. Louis.

Employees who are promoted to their first supervisory position must complete a Web-based curriculum within 30 days. The training provides a basic instruction to company policies and procedures, finding and using resources, and understanding fiduciary responsibilities. Then entry-level managers are required to spend one week at a local training site studying performance management, reviewing organizational structure and learning state and regional laws and regulations that govern the IT industry.

Finally, the managers must attend an introductory session at the Leadership Center, where for two weeks, they meet with Boeing managers from around the world to develop leadership skills.

Boeing's 2,000 executives and 24,000 managers keep the center booked solid. They're required to take core leadership courses at the center at five specific turning points in their careers: when they receive their first management assignments, become managers of managers, prepare for executive responsibilities, begin their first days as executives and assume the challenges of global leadership.

"There is a place in our world for distance learning and online sessions, but the essence of leadership has to do with interpersonal skills and behaviors," Wilmott says. "The Leadership Center is about bringing people together and creating a common vision and language and direction for the company.

"We want our managers to understand what our economic profit model is, how we create value and what a top-performing, global organization is all about," he adds. "You can't get that from reading an e-mail. We use the center to roll out those messages."

Return on Investment

Measuring the return on investment of a corporate university or leadership development program is tricky. "Employers with online courses have more information on the exact skills and capabilities that employees bring to the job," says Meister.

It's one thing to measure how well a programmer did on a Java certification exam, but it's another to figure the value of training IT executives.

Boeing uses several metrics to evaluate the effectiveness of the programs delivered at its Leadership Center, including its annual employee survey. The survey has shown that executives and managers who have attended programs at the Leadership Center are more satisfied in their jobs than those who haven't yet attended the programs. Even more important, says Wilmott, is that employee satisfaction scores are higher for groups whose leaders have been to the center.

"People report they see a difference in their managers' behaviors and abilities as a result of attending programs at the learning center," he says.

Two other general indicators are critical, too, according to Wilmott.

"The first measurement is, do the managers come back to the center willingly for more training? And the second is, do headhunters come to Boeing to recruit executives for other companies?" he says. "Of course, companies are only as good as their leaders, and Boeing's stock price [has] doubled in the last 18 months." ◗

Vitiello is a freelance writer in East Brunswick, N.J.

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Automated Clearing House

DEFINITION

The **Automated Clearing House** is a secure, private electronic payment transfer system that connects all U.S. financial institutions. Direct paycheck deposits and debit card purchases are two examples of electronic fund transfers that go through this network.

BY MARIA TROMBLY

THE AUTOMATED Clearing House (ACH) system is a secure, private network that connects banks to one another by way of the Federal Reserve Board or other ACH operators. This network enables electronic payments, such as automatic payroll deposits and debit card purchases, to be handled and processed.

Even though the ACH is privately configured, the Internet is fast becoming a critical component. Because executing ACH payments is cheaper and faster than processing paper checks, both business-to-business and business-to-consumer e-commerce activities are becoming ever more dependent on the ACH system, thus forcing it to evolve.

For example, the National Automated Clearing House Association (NACHA) in Herndon, Va., which sets the rules and standards for ACH transactions, recently released a set of guidelines for e-commerce merchants that accept ACH payments on their Web sites.

Previously, there were no rules except those set by the merchants' banks. As of March 16, however, merchants were required to have an authentication system in place so they can identify their customers electronically, says NACHA spokesman Michael Herd.

In addition, merchants must now have systems in place to verify routing numbers, conduct annual security audits and have a security equivalent of 128-bit Secure Sockets Layer encryption or better.

In the future, NACHA may also be required to develop standards for wireless and person-to-person payments, said James VanDyke, an analyst at Jupiter Research in New York.

Pump It Up

Still, e-commerce isn't the only factor driving increased volume on the ACH network.

The total number of corporate ACH payments last year was more than 902 million, up from 818 million in 1999, according to NACHA Executive Vice President William Nelson.

This figure includes both business-to-business and government-to-business payments, as well as business-to-consumer payments such as payroll deposits. The dollar amount of these payments exceeded $11.6 trillion last year, according to Nelson.

Some of the biggest growth occurred through financial electronic data interchange (EDI) networks, where businesses exchange payment information with established partners.

"B2B on the Internet is contributing to the growth of financial EDI because payments still need to be made, no matter how the transaction is originated," Nelson says.

One of the reasons why ACH has become such a popular payment mechanism on the Web is that it's less expensive than most alternatives.

For example, the cost of receiving a credit card payment over the Internet averages approximately 2.5% of the total transaction cost plus a flat fee ranging from 15 to 30 cents per transaction, compared with a fee of just 2.5 to 25 cents per ACH transaction.

In addition, credit card limits are typically too low for most businesses to use to finance big-ticket items such as industrial equipment, says Avivah Litan, an analyst at Stamford, Conn.-based Gartner Inc.

According to Gartner research, 17% of business-to-business payments are now made electronically; the rest still involve paper checks or paper money orders. Of the transactions that are now conducted electronically, 33% are ACH payments and 39% are wire transfers.

Wire transfers also go through the Federal Reserve, but they differ from ACH payments in several important ways. For instance, ACH payments are processed in batches, so a transaction can take a day or two to be completed. Wire transfers, on the other hand, take place immediately.

In addition, ACH payments can be repudiated. There's a window of time in which a consumer or business can decide to cancel the payment. Wire transfers can't be canceled.

There also isn't any guarantee that an ACH payment won't bounce in the event that there isn't enough money in an account to cover it. Merchants can try to minimize such risks by signing up with services from firms like TeleCheck Services Inc. in Houston to look up a bank account in a database, but wire transfers are guaranteed.

On the upside, ACH transactions cost considerably less than wire payments, although actual costs vary by bank. A simple ACH transaction usually costs less than 25 cents, Litan said, whereas a wire payment typically costs between $10 and $40.

That's why ACH payments are a common option with peer-to-peer payment systems such as that of Palo Alto, Calif.-based PayPal Inc., which lets individuals send money to one another via e-mail.

In addition to PayPal, several other banks also offer consumer-oriented payment services: Citigroup Inc. in New York has c2it, Wells Fargo Bank NA in San Francisco touts BillPoint, and Bank One Corp. in Chicago offers eMoneyMail. CIBC National Bank in Orlando is the engine behind Yahoo Inc.'s PayDirect service.

"It's going to become a ubiquitous feature on online banking sites," says Paul Jamieson, an analyst at Waltham, Mass.-based Gomez Inc.

The biggest disadvantage to sending money through the ACH system is that it doesn't transmit a lot of information along with the money.

This isn't much of a concern for individuals, who only need to know, say, the address of a service station where they bought gas. But corporations using electronic payments for business-to-business transactions usually need more information — not just where the money went, but what account it needs to be charged to internally, whether there was an invoice and whether the account was paid in full.

To address this issue, several companies have developed ways to attach bills, invoices or other data to ACH transactions.

"These companies take the best of the ACH network — that it's a low-cost way of moving money — and they build these value-added services like digital signatures, guarantees of payment and online validation, like you get with a credit card," said Litan.

Total ACH Volume
(number of transactions)

1989	1.33B
1990	1.55B
1991	1.96B
1992	2.21B
1993	2.56B
1994	2.93B
1995	3.41B
1996	3.93B
1997	4.55B
1998	5.34B
1999	6.25B

SOURCE: NACHA, HERNDON, VA.

HOW IT WORKS

1) A company sends an electronic file to its bank that contains a list of electronic payroll payments that need to be made to employees.

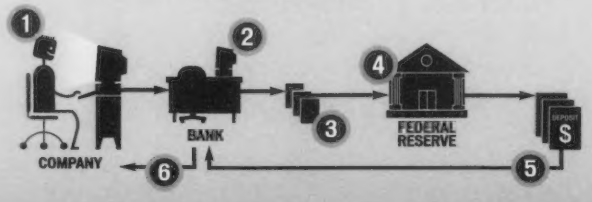
2) The bank collects this file and identifies those payments that have to be routed to other banks.

3) The bank sends this list of payments to its ACH operator, usually the Federal Reserve.

4) The Federal Reserve sorts these payments by destination and then deducts from (or adds to, depending on the final net balance) the balance of funds the bank keeps on reserve.

5) The Federal Reserve then sends a file to the bank that contains all of the deposits that were made to its clients' accounts.

6) The bank credits the funds to the receivers.



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JOE AUER/DRIVING THE DEAL

Keep Consultants Far From the Enemy

CONSULTANTS, AT LEAST THE SUCCESSFUL ONES, earn a living selling their knowledge, services, intellectual property and the like to a wide range of clients. Sometimes they sell even yours. So, when you're hiring them, always ask yourself: "Is it OK if my consultant does the same type of project for one of my competitors?" The answer: It depends on the situation. And here's why.

First, you must thoroughly understand the role your consultant is going to play within your organization. It's important that you evaluate every pending consulting assignment to determine how the consultant will be used and to what type of information he will have access. If the consultant will be involved in anything related to developing unique processes, procedures or systems that will improve your company's competitive advantage, be very careful. Don't allow a situation in which your consultant can "create" the same thing for one of your competitors. Obviously, when a competitive advantage is at stake, extreme caution is in order.

When you first introduce your concerns, your consultant may balk at what he could interpret as an attempt to limit his ability to make a living. He will probably argue that the confidentiality agreement between him and your company provides all the protection you need.

But most confidentiality agreements will protect you only from disclosure of intellectual property. It won't protect you from the consultant using his "learnings" in subsequent engagements.

Therefore, get your consultant to agree not to do a similar project for one of your competitors for one to two years. This gives you extra protection and time to leverage the money you paid in consulting fees into improved revenue, earnings and market position. To be sure, one of the challenges is that there can be a fine line between what your consultant owns and what you own.

Set Licensing Limits

Consultants come to an assignment with tools, techniques and knowledge and leave with improved tools, techniques and knowledge based on what they learned while working for you. There's nothing wrong with that. Improved knowledge makes them more valuable to everyone. The rub comes when this "improved knowledge" of your internal systems is used to help one of your direct competitors better compete with you.

In some cases, your consultant may agree that you own the work product (and why shouldn't you?) or grant you a license for its use. You still aren't completely protected because the consultant can use that knowledge to do it all over again. Or, if you have a nonexclusive license, the consultant can license the work product to others, including your competitors.

JOE AUER is president of International Computer Negotiations Inc. (**www.dobetterdeals.com**), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS: The Association of High Tech Acquisition Professionals. Contact him at **joea@dobetterdeals.com**.

So, at least limit the consultant's licensing rights. It's a good idea to get ongoing protection that the work or any of its versions, iterations, enhancements or concepts won't be duplicated for one of your competitors for a specified period of time.

Of course, obtaining this competitive advantage protection can be difficult. The easiest time to get it is when you're negotiating a new relationship.

But be prepared for strong objections. Take the time to carefully explain the significance of your request and the potential harm it can bring to your organization if the protection isn't granted.

Be Flexible

Negotiating this protection will require some flexibility on both sides. You, as the customer, should be willing to limit the protection only to similar projects for your nearest competitors.

The consultant should recognize that you're not severely limiting his ability to earn a living because he has many other potential clients. You're asking only that the same set of services not be done for your direct competitors for a limited time.

Let's not forget that we can be burned by our own acts of omission. To prevent a scorching, recognize the true objectives of our vendors: profits and risk avoidance.

Don't buy the "trust us" fairy tale. Ensuring that our contracts have sufficient anticipatory protection is, or should be, the objective. ◗

BRIEFS

Security Services Move to the U.S.

Germany's Secunet Security Networks AG last week announced its entry into the U.S. technology security services market with the opening of Austin, Texas-based Seculab Inc., the world's first common criteria testing center accredited in both the U.S. and Europe. U.S. technology companies that sell IT products to the federal government will be required by July 2002 to meet this common set of criteria for technologies handling sensitive data. Seculab is one of only five common criteria testing labs in the U.S. accredited by the National Security Agency and the National Institute for Standards and Technology. In addition to common criteria testing, Seculab provides IT security consulting services, such as security audits, vulnerability assessments and public-key infrastructure consulting and implementation. The center also has access to Secunet's global network of security experts.

Compuware Teams With Detroit Schools

The Detroit Public School District has hired Compuware Corp. to provide IT services for the district under a two-year contract valued at about $15 million annually. The deal with Farmington Hills, Mich.-based Compuware is expected to save the district about 15%, compared with its current IT costs, by taking over IT functions for areas such as human resources, finance and budget operations, and the district's Web site. Compuware will offer employment to IT employees from the school district under the agreement, which also includes options for two extensions of two years each.

Pick Up the Pace, Say Executives

Many companies move too slowly for today's top executives, according to a recent survey of more than 3,000 business executives conducted by the Net Futures Institute. Most business executives, 69.7%, believe their organizations move too slowly, while 23.8% said their companies move at just the right pace, according to the survey. Only 6.5% said their organizations move too quickly. The survey was conducted with Net Future Institute members, who represent senior management of more than 1,500 companies worldwide, including more than half of the Fortune 100 companies.

"These results suggest that top executives are frustrated at their inability to generate change at their organizations," said Chuck Martin, chairman and CEO of the North Hampton, N.H.-based Internet research firm.

IBM Joins Show Biz

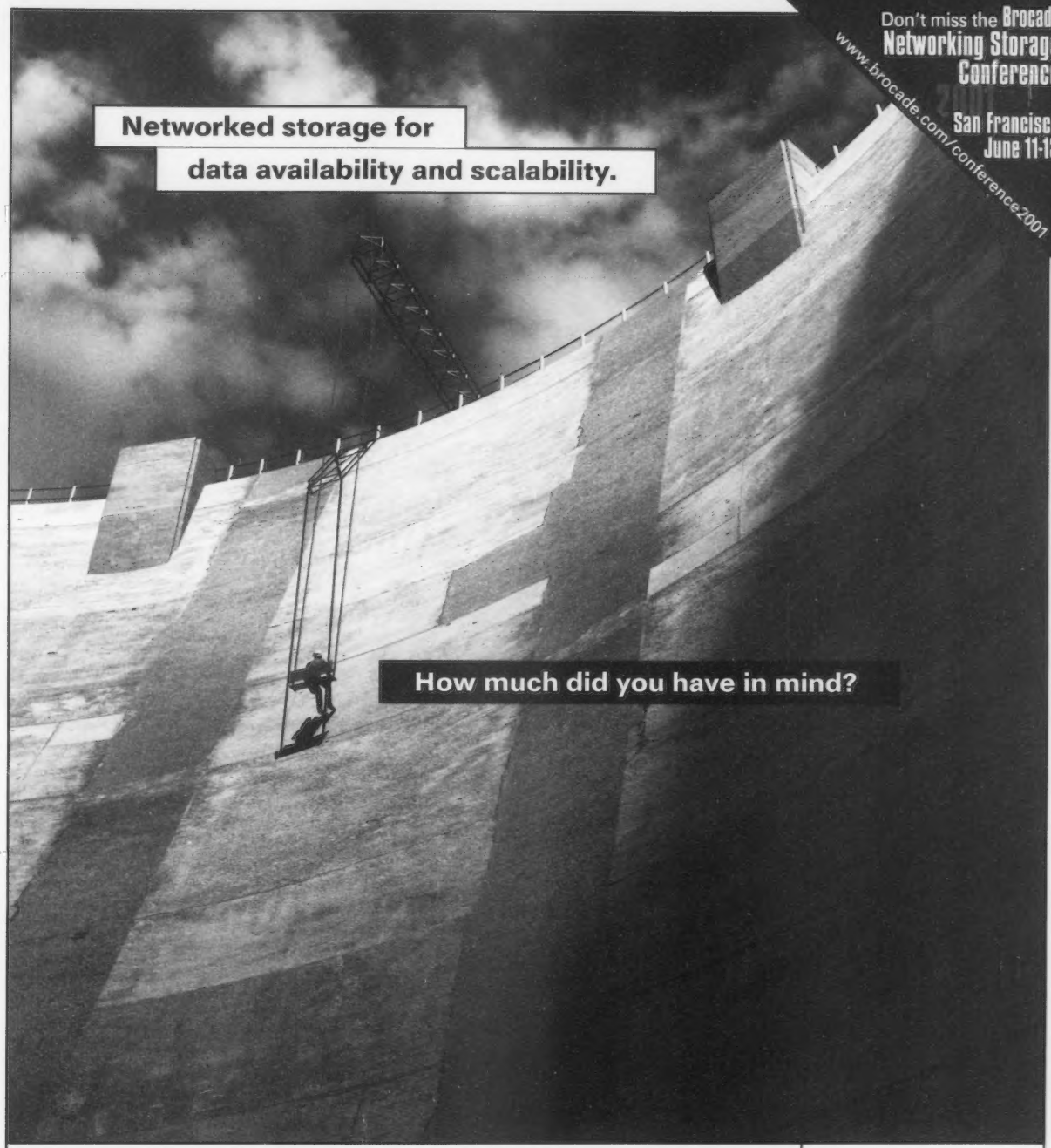
IBM and NeTune Communications recently announced an alliance that includes an equity investment by IBM in NeTune; a $112 million, five-year outsourcing agreement; and a plan to jointly develop digital technology and services for the entertainment industry. The first initiative between the companies will be to roll out NeTune's Showrunner services, which permit the transmission of high-resolution digital content during film and television production to and from anywhere in the world. NeTune, in Culver City, Calif., is a telecommunications firm for the entertainment industry.

Mass. Is Tops Among Leading IT States

Massachusetts, California, Maryland, Colorado, Washington, New Mexico, Texas, Utah, Connecticut and Delaware ranked highest among the 50 states in overall technological competitiveness, according to the 2001 States' New E-Economy Index (SNEI), released last week by Meta Group Inc. in Stamford, Conn. The SNEI weighs such factors as the ability to create and attract IT jobs, technological innovation, transformation to a digital economy, economic competition and globalization.

Meta Group also tracks the technological competitiveness of nations with its Global New E-Economy Index and its Worldwide IT Trends & Benchmark Report.

For more information about the reports, visit *www.metricnet.com*.



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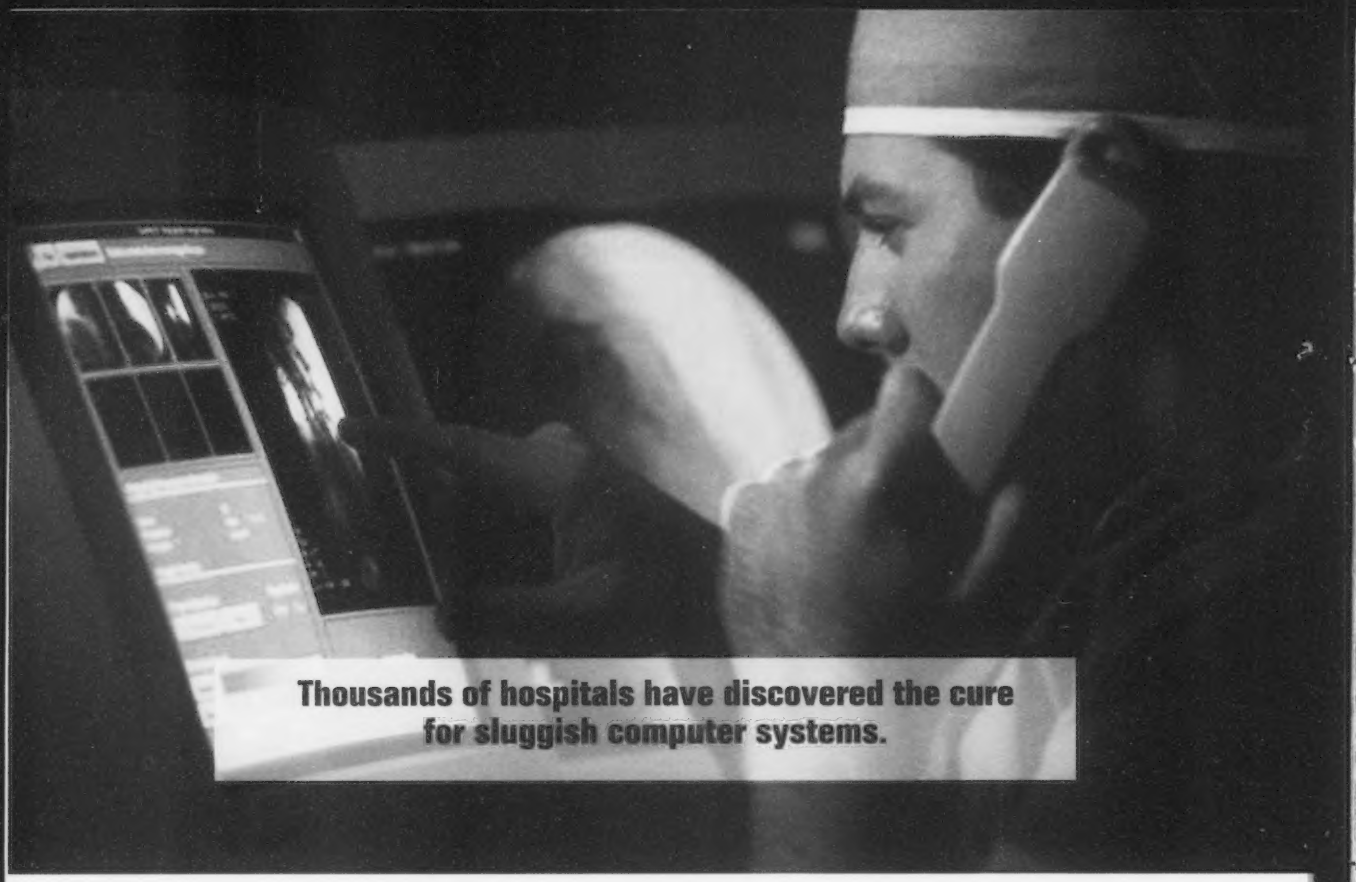

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TECHNOLOGY

HACK OF THE MONTH

Computerworld security specialist Deborah Radcliff catalogs the rise of Internet crime and offers advice about how to keep your organization from becoming a victim. The bottom line: Think like a crook. ▸ 50

SECURITY JOURNAL

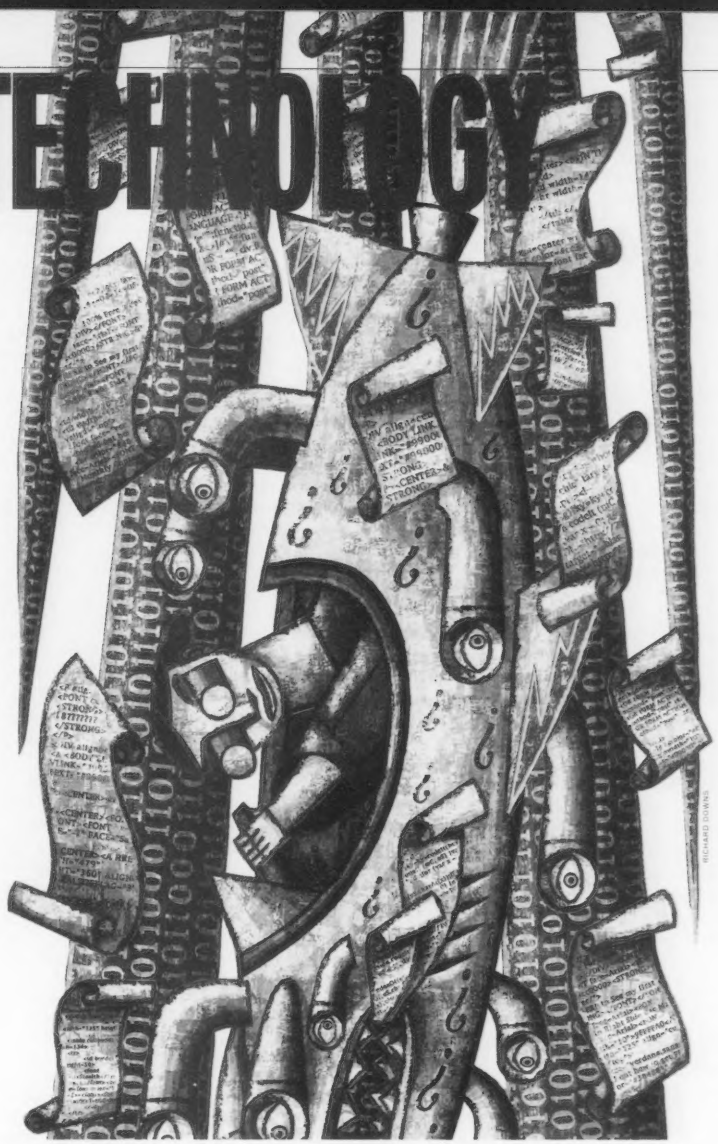
The staff is trained. The tools are in place. What better way to test the security infrastructure than by launching an attack? Security manager Mathias Thurman initiates a fire drill to make sure everything is up to snuff — and to meet his company's service-level agreements. ▸ 54

FUTURE WATCH

As the demand for data storage explodes, developers of optical storage technologies are scrambling to condense more and more bytes into a smaller space. Until the long-awaited promise of holography is kept, fluorescent multilayer discs may do quite nicely. ▸ 56

EMERGING COMPANIES

Quiq's Web-based customer service application broadens in-house support efforts by allowing outside experts to answer tough questions. Quiq can help a company turn its network of service specialists, business partners, distributors and customers into a collaborative help desk community. ▸ 60



NEW SEARCH METHODS EMERGE

EVOLVING SEARCH TECHNOLOGIES are incorporating image recognition, natural language, and statistics and are even gluing different information sources together. They're also changing the rules for searches. For the first time, users schooled in the intricacies of the Boolean search language's *and*s and *not*s are using natural language. New features are appearing not only in online search engines, but also in venerable enterprise content management software for searching corporate documents and knowledge bases.

58

DEBORAH RADCLIFF/HACK OF THE MONTH

Think Like a Crook

SIX YEARS AGO, I learned what it's like to get my phones phreaked (phone hacked) and my e-mail sniffed while researching Kevin Mitnick's life on the lam for the book *The Fugitive Game* by Jonathan Littman. I'm no rocket scientist, but I figured this Internet crime thing was going to be big. I just didn't realize how big. Just look at the following statistics:

- Viruses were up 20% in 2000, meaning that as of the end of last year, a total of 53,000 viruses had been recorded thus far, according to the Computer Security Institute (CSI) and Network Associates.
- 186 respondents to an annual CSI/FBI computer crime survey reported that their aggregate corporate losses due to computer crime were up from $120 million in 1999 to $378 million last year.
- Internet-related fraud complaints to the Federal Trade Commission were up from 8,000 in 1998 to 23,000 last year (not including identity theft).
- Internet-related child pornography cases opened by the FBI quadrupled from 700 in 1998 to 2,800 last year.
- Bank and brokerage accounts belonging to Oprah Winfrey, Ross Perot, Steven Spielberg and several of the nation's top moneymakers were breached by a convicted swindler last month.

How did we get into such a spot? The medium that's so full of promise has gained a bad reputation among the very consumers businesses want to attract. Here's the answer: haste.

"The economics of the Internet are so powerful that to be competitive, everyone has been impelled to do some portion of their business over the Internet, whether e-mail or Web commerce or business-to-business transactions," says Shawn Hernan, vulnerability handling team leader at the CERT Coordination Center at Carnegie Mellon University in Pittsburgh. "So there's been this mad rush to get in on the ground floor without paying attention to all the details first — like security."

If the economy is any indication, that rush has passed. Take advantage of this slowdown to dust off your policies, evaluate what's working and what's not, and take inventory of your security architecture. Here are some tips to accomplish that:

1. Start by reassessing your level of risk, advises Mark Rasch, vice president of cyberlaw at Predictive Systems, an IT consulting company in New York.

"Even the Defense Department admits there are no electronic Fort Knoxes. So you have to take some risk. Just don't take overwhelming risks in your rush to beat the competition," adds Lloyd Reese, a consultant in northern Virginia.

2. Update your policy and technology so that corporate computers are used for business only. That alone will reduce the number of viruses and amount of pornography getting into your businesses, says Rasch.

3. Monitor who's linking to your site, Rasch continues. Someone could be trying to facilitate fraud through links to your business, something that Chris Brandon, founder of Internet investigative firm Brandon Internet Services Inc., sees all the time.

4. Assess your infrastructure. High employee turnover and rush to market have made just knowing what's in the infrastructure pretty much impossible, says Steve Wadlow, CIO at Jerboa, a security consultancy in Cambridge, Mass. But now that the economy's slowing, clients are ordering infrastructure assessments rather than security patches, he adds.

5. Eliminate the top 10 vulnerabilities identified by the SANS Institute as responsible for the majority of successful computer attacks (to see the list, visit *www.sans.org/topten.htm*).

Toss in some best practices, keeping in mind that any infrastructure must be flexible enough to accommodate new ways of doing business.

6. Push software and service vendors to change their ways. Don't buy insecure software. And call for stiffer regulatory action. It's a shame, says Hernan, that software vendors still develop products with vulnerabilities that date back to the 1970s, like buffer overflows and faulty timing windows

7. Litigate. For example, if a company is compromised because of poor security, and its machines are used to attack other downstream businesses, then the upstream business should face litigation for its liability, says Rasch.

DEBORAH RADCLIFF is a *Computerworld* feature writer. Contact her at deborah_radcliff@computerworld.com.

Most of all, remember to think like a criminal. Because the same things that drew your business to this medium — low cost, anonymity and free enterprise — are also what drew the less honorable Netizens that have given the Internet a bad name. ◗

Enterprise Net Pulls Sensor Data From Remote Facilities

Sends data to home management app

BY JAMES COPE

While remote monitoring of physical assets isn't a new idea, treating a physical facility as an address on a corporate network and using that network to transport data from sensors to a central management console is just starting to take hold.

One company that's sold on transporting facilities data over corporate networks for automated monitoring is SpectraSite Communications Inc., an owner/operator of thousands of cellular towers scattered across the U.S.

Three years ago, the company had 200 towers, but now it has 10,000, said SpectraSite CIO Brian Dietrich. Sending trucks to check the status of lights and backup power at that many facilities wasn't economically feasible, he said, so SpectraSite decided to invest in a remote management system using technology developed by Opto 22 in Temecula, Calif.

According to Dietrich, the system uses a special server that costs about $2,000 at each tower site to collect data from sensors that monitor tower lights, backup generators and even the electronic keypads used by technicians to access the facility.

DIETRICH: SpectraSite needed a way to collect data from 10,000 towers.

That data is then backhauled through a remote dial-up to SpectraSite's headquarters in Cary, N.C., Dietrich said. There, information from all of the towers on the network is collected and reported in Unicenter system management applications from Computer Associates International Inc. in Islandia, N.Y.

Dietrich said his company elected to use Opto 22's technology because it's designed to collect data from different types of sensors, including those that read temperatures, fuel levels and on/off status.

Moreover, he noted, the Opto 22 server translates sensor output into data that can be transported over Ethernet, the network standard used by most large firms.

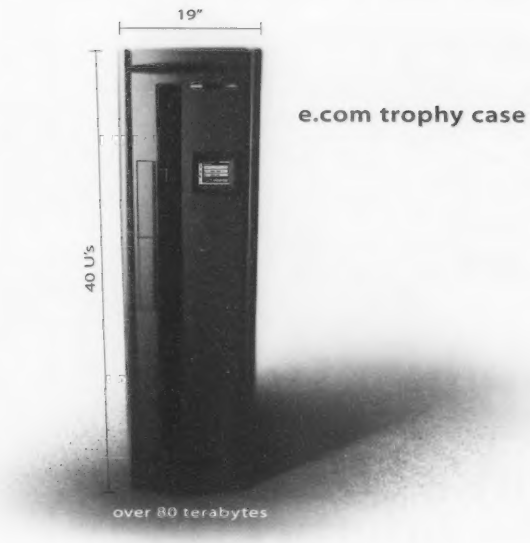
"We basically pull data from every Opto 22 box twice a day," Dietrich said. But he added that when there's an emergency, such as a tower light outage, "the Opto box calls us."

SpectraSite uses a variety of connections to access the Opto 22 servers, Dietrich said. "For urban tower sites," he said, "we pull information using telephone land lines, fiber-optic and PCS [personal communications services] wireless."

Land lines, which Dietrich said cost his company $40 to $45 per month per tower, are the most expensive to use, while PCS cellular connections run about $30 per month for each tower site. At some sites, Dietrich said he's been able to cut connection costs even further using AT&T Corp.'s Cellular Digital Packet Data wireless service. The AT&T service costs $8 per month plus 5 cents per kilobyte transmitted.

Patrick Dryden, an analyst at Illuminata Inc. in Fort Worth, Texas, noted that pulling data from remote sensors into the enterprise network requires close cooperation among facilities and IT managers. Corporate IT is usually a world unto itself, as are facilities and process control management, said Dryden.

Both IT and facilities and process control management need to understand that there's a business case for integration, he said. ◗



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Standards Group Dumps PC Storage Protection Proposal

BY LUCAS MEARIAN

The latest in a line of controversial standard proposals aimed at preventing the copying and unauthorized distribution of protected data stored on removable media devices has been rejected by the technical committee working on the issue.

The members of Technical Committee T13, which is operating under the aegis of the National Committee for Information Technology Standards (NCITS), voted 8-7 against a surprise proposal submitted in February by San Jose-based Phoenix Technologies Ltd. The last-minute proposal was an unexpected alternative to an encryption standard previously put forward by IBM.

IBM and fellow proponents Intel Corp., Matsushita Electronic Components Co. and Toshiba Corp. withdrew their proposal in favor of the one from Phoenix Technologies. Critics had contended that IBM's submission would create difficulties for users who simply wanted to create backup copies of their data.

More Generic Approach

Phoenix Technologies' proposal was said to include a more generic approach to incorporating copy-protection mechanisms into the Advanced Technology Attachment (ATA) standard, which dictates the way PCs communicate with hard drives and other peripherals, such as flash memory, Zip drives and DVDs. The approach suggested by Phoenix Technologies would have let manufacturers program up to eight commands, such as privacy or audio/video streaming instructions, into a disk drive.

The vote against, with four abstentions and four no-shows, fell far short of the two-thirds required to pass a proposed standard, according to committee spokeswoman Maryann Karinch.

The T13 panel is responsible for all the ATA-related interface standards used on PCs and mobile computers. Kate McMillan, director of the secretariat at the Washington-based NCITS, said the proposed standard generated "a lot of interest among committee members" because of its versatility.

Critics of both IBM's and Phoenix Technologies' proposals, such as John Gilmore at the San Francisco-based Electronic Frontier Foundation, called them a threat to the civil liberties of users and charged that the two approaches would have allowed technology vendors to control what computers could read or copy.

Despite the outcome of the balloting, McMillan said the remainder of the ATA standards that the T13 committee is developing remain on a "steady track toward completion" this summer.

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PRESTON EDWARDS, IMDIVERSITY.COM

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Security Manager Initiates Friendly Fire

Mathias Thurman tests his staff by launching a denial-of-service attack against his own network

BY MATHIAS THURMAN

CONDUCTING "FIRE DRILLS" is an important part of my job. I conduct various drills throughout the year to test our company's ability to react to different types of security-related events. I picked this week to set a fire and see how our staff responded. The reaction was one of surprise, but I'm pleased to say that the actions taken were exceptional.

The first question was what type of drill to conduct. Our fire drills must cover a variety of security issues. Backups are a good example.

Every three months, I hold a drill in which I randomly pick a file, a set of files or an entire client company's database and have our administrators restore either the latest backup or a backup from an off-site archive to a specified location.

SECURITY MANAGER'S JOURNAL

I have to do this because we have service-level agreements (SLA) that dictate certain service-level commitments to our customers. Our SLA regarding backups dictates that we will restore a company's data within a certain period of time or we must pay the company a remedy. The remedy might mean a free month of service or a cash payout. It all depends on the customer and level of failure to perform according to the SLA.

I also perform fire drills to test the reaction of our network operations analysts to security events. Typically, I use an event that produces some sort of indication on our intrusion detection system (IDS) sensors, which are configured to send an alert to a central monitoring station.

In the past, I usually did something like attempting to log in to a server as a root a bunch of times — like 50 times. That usually generates a lot of attention. I usually time the exercise and test to see if the analysts are able to trace the IP address to the source.

So what to choose this time? There are many tests that can be executed to test the security and responsiveness of people and infrastructure (meaning the IDS). But a recent e-mail I received from a *Computerworld* reader prompted me to test our infrastructure's resilience and response capabilities in relation to denial-of-service attacks.

Launching a denial-of-service attack is a very touchy subject because such an attack can cause servers to crash, hang or reboot. I wanted to make this a worthwhile test, one that would both challenge and set a sense of urgency for multidepartmental units.

For my testing, I planned to launch what's called a SYN Flood attack. For the uninitiated, I've written a brief definition of what a SYN Flood attack is and why these are so deadly (see box). The attacks create a stream of requests that overwhelm a server's ability to respond, making the system inaccessible to legitimate users.

Having decided on the type of drill, the next question was the logistics of when, where and how to launch the attack. Should I set it in motion during normal business hours, or should I wake our engineers out of deep sleep? Which servers should I target? Do I take down legitimate customers and run the risk of crashing a database? If I do this and we lose customers because of it, my boss, the CIO, will be ticked off. Hmm, such decisions.

Choosing a Victim

I chose our corporate e-mail server as my victim. The attack won't directly affect customers, yet everyone will be screaming if they can't e-mail their buddies with the latest office gossip, jokes or links to cool Web sites. I had my security engineer build a Linux server and retrieve a good SYN Flood generator off the Internet. Guess what? There are literally dozens of denial-of-service tools available for free on the Internet. Some are just source code, which must be compiled, but some are the point-and-click Microsoft Windows versions, which can be installed and configured with ease. It's a scary world out there.

Releasing the Floodgates

I chose to launch the attack at 10:30 a.m., just after the morning meetings but before lunch. I ran a ping test against the e-mail server to watch for responsiveness as I began the attack. To launch the test, I ran a continuous stream of TCP SYN Flood packets against the server from a spoofed IP address. I picked the generic IP address 0.0.0.0 as the spoofed address. That way, I wouldn't risk picking a real IP address that might be vulnerable if someone on staff decided to retaliate.

Almost immediately after launching the attack, the e-mail server failed to respond. In fact, I later found out it had crashed — hard. About five minutes later, I got a call from the network engineering manager. He said that on one of the internal routers, he was experiencing an increase of traffic, which looked suspicious. I asked him to look into it and get back to me. A few minutes later, he advised that the packets seemed to be coming from a spoofed IP address and that they were half-opened connections — that is, SYN-ACK packets (see box). I asked what could be done, and again he responded like clockwork: "Configure the Cisco router for TCP Intercept."

TCP Intercept is a Cisco router feature that actually intercepts the SYN-ACK packets and keeps track of them. If the router doesn't see the corresponding SYN-ACK-ACK back from the source (client) within a certain time period, the router breaks the connection on behalf of the server.

Like most companies, we don't run TCP Intercept all the time because it takes up quite a bit of the router's resources. We just use it as a response mechanism in the event that we become the victim of a SYN Flood event or attack.

After enabling TCP Intercept and rebooting the e-mail server, the fire drill was over. Yes, there was some postmortem work to be done, but the main goal of the fire drill was accomplished. The whole incident lasted about 15 minutes. I wished it could have been a little quicker, but nonetheless, it went well. At the end of the day, I was confident that our network engineering department knew how to recognize and handle a SYN Flood attack.

Backup recovery and denial-of-service testing are just a few of the many different types of fire drills that I can use to test the security posture of my company. My next test, which I am excited about, will be a social engineering test. This entails tricking someone into giving me unauthorized access.

I will accomplish this in two ways. First, I'll make a telephone call to our support desk in hopes of getting the support technician to reset or give me a password to our application. The second test will involve sending spoofed e-mail to gain access or exceed authority. I'll let you know what happens next time. ◗

THIS WEEK'S GLOSSARY

TCP SYN Flood Attack: A TCP SYN Flood attack is a denial-of-service attack that takes advantage of the normal workings of TCP/IP, the transport protocol that's the foundation for the Internet and most LANs today. A normal TCP connection begins with a series of introductions. The client first sends a synchronization (SYN) packet to a server. The server then replies with a SYN packet accompanied by an acknowledgement (ACK) packet. When the client sees this SYN-ACK packet, it then sends back a final ACK packet (SYN-ACK-ACK), and the session begins. The purpose of the session could be Web page requests, e-mail retrieval, file transfer protocol or Telnet terminal sessions.

In a TCP SYN Flood attack, the perpetrator sends the server a SYN packet from a spoofed (fake) IP address. The server then returns a SYN-ACK and waits for the final SYN-ACK-ACK packet, which never comes because the spoofed IP address doesn't exist. The server repeatedly waits, then retransmits the SYN-ACK packet to the spoofed IP address when no response comes.

This process ties up server resources. The server reserves a finite amount of memory to hold SYN packets while waiting for these SYN-ACK-ACK packets from the client. In addition, the server's processor must generate the SYN-ACK packets and the network must accommodate the bandwidth necessary to send and receive packets. By flooding the server with spoofed SYN packets during a short period of time, the perpetrator can overwhelm the server. Memory fills up so that none is available for legitimate traffic, and the server hangs, crashes or reboots.

■ This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. It's posted weekly at *www.computerworld.com* to help you and our security manager better solve security problems. Contact him at mthurman@hushmail.com or head to the Security Manager's Journal interactive forum.

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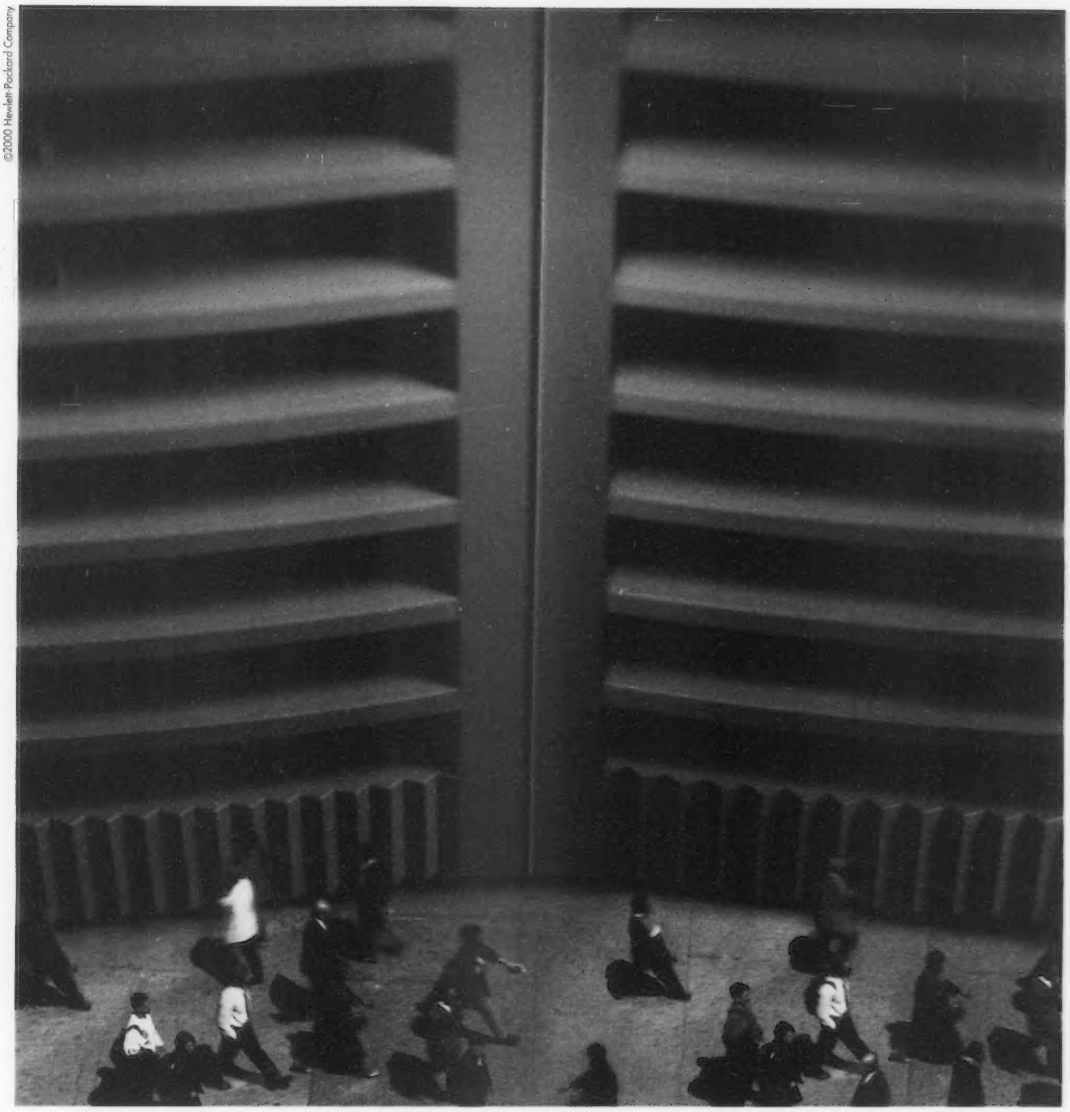

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The Next Step In 3-D Storage

Fluorescent multilayer discs promise to provide 140GB of storage in the space of a CD. By Jan Matlis

AS THE DEMAND from businesses and consumers for data storage explodes, developers of optical storage technologies are scrambling to condense more and more bytes into a smaller space. Until the long-awaited promise of holography as a storage medium is realized, fluorescent multilayer discs (FMD) may do quite nicely.

Constellation 3D Inc. (C3D) in New York has come up with a method of using red lasers and fluorescent dye to increase to 10 the number of information layers that can be put on each side of a disc, while matching the density and transfer speeds of DVD. In the future, the discs could have as many as 100 layers, according to John Ellis, director of marketing at C3D.

CD-ROMs use one information layer that reflects an infrared laser to supply 650MB of storage on a one-sided disc. DVDs use a red laser to supply up to 9GB of storage on a two-sided disc with two layers of storage per side.

In FMD technology, fluorescent dye replaces the reflective and semireflective coating in which information is stored in CD-ROMs and DVDs. This allows for more layers of information, because laser light isn't blocked from traveling deeper into the medium.

There's less noise and interference in the return signal as well, according to Ellis. That's because the fluorescent light that's emitted when a focused laser strikes a pit on one of the information layers has a different wavelength than the laser. The emitted fluorescent light carries the information, and the reflected laser is filtered out in the read device.

Both Philips Electronics NV and IBM have proposed the concept of multilayer reflective optical discs. The reflected coherent light of the probing laser, however, causes interference and cross talk among different information levels that drastically degrade the emitted signal.

The cost of a single FMD may be higher than that of other storage media, but its cost per gigabyte should be considerably lower, according to C3D. FMDs now in development will hold 140GB of data, as opposed to the 20GB predicted for next-generation DVDs.

C3D is banking on FMD technology becoming the standard in all kinds of small portable appliances and electronic devices. FMD will allow gigabytes of storage on a disc the size and shape of a credit card. Lev Zaidenberg, C3D's director of business development, says he expects the technology to revolutionize data storage within five years. It will replace CD and DVD technology and will be used in mobile phones, handheld computers, video recorders, PCs, digital cameras and high-definition TVs, he predicts.

Other Technologies

Some industry analysts note, however, that users interested in enhanced data storage shouldn't plan on tossing out their CD-ROMs and DVDs soon. Other efforts to accelerate the progress of storage technology have promised much — some for many years — but as yet have yielded little.

One of the technologies that hasn't made it out of the laboratory is blue lasers.

With shorter wavelengths and, subsequently, greater storage capabilities than red lasers, blue lasers would burn smaller pits and cram more bits onto removable data. In the mid 1990s, some trade magazines predicted that blue lasers would be in commercial development by 2000. Even with companies like Sony Corp., 3M Co., Philips and Panasonic Industrial Co. involved in research and development, blue-laser devices remain too unwieldy for commercial applications.

In April 1999, another laser technology, very small aperture lasers (VSAL), was sold by Lucent Technologies Inc. to Siros Technologies Inc. in San Jose. At the time, the firms touted VSAL as a technique that would "enable significant improvements in data storage density" — as much as 200GB to 500GB per square inch.

Unfortunately, the read-write head in VSAL systems has to be a hard disk drive 25mm from the surface of the disc, requiring assembly in a clean room and making the product appropriate for nonremovable media. This isn't a formula for success in the storage market, where capacity rules and portability is very important.

A similar history can be written of more revolutionary storage ideas such as holography, whose antecedents aren't rotating discs but photography and holography.

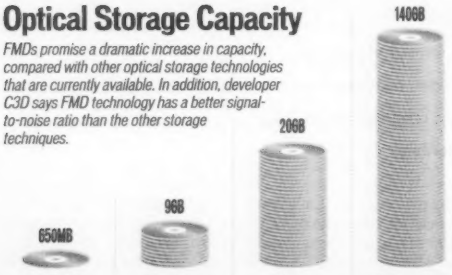
The lure of holography is the density of data that can be saved — about 1TB in a crystal the size and shape of a sugar cube. The recording material is a photosensitive crystal, which is illuminated by a reference beam and a signal beam. The resulting interference pattern is recorded in the crystal. Shining a reference beam through the interference pattern returns the original signal beam. Entire pages of data can be restored and read simultaneously. The address of the data is the angle and frequency of the reference beam.

The holographic storage "revolution" has been coming since the 1960s and hasn't arrived yet, says Ellis. FMDs provide a large incremental step in optical storage capacity while users wait for the terabyte-holding crystal cube.

Matlis is a freelance writer in Newton, Mass.

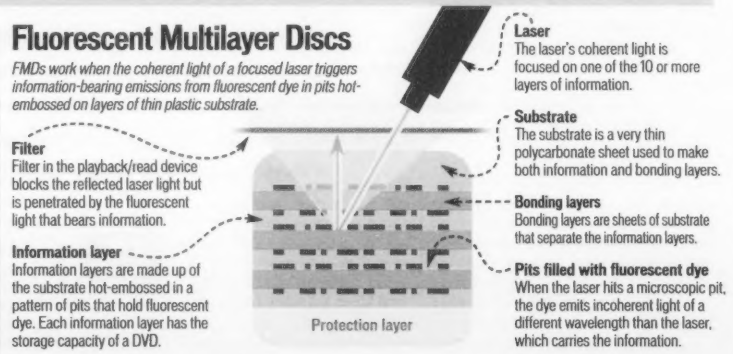
Optical Storage Capacity

FMDs promise a dramatic increase in capacity, compared with other optical storage technologies that are currently available. In addition, developer C3D says FMD technology has a better signal-to-noise ratio than the other storage techniques.



Fluorescent Multilayer Discs

FMDs work when the coherent light of a focused laser triggers information-bearing emissions from fluorescent dye in pits hot-embossed on layers of thin plastic substrate.



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New search tools are incorporating image recognition, natural language and statistics; even gluing different information sources together. By Mathew Schwartz

SOUPED-UP SEARC

IT'S FEB. 1, the score is tied, 83-83, and under a deafening roar, University of North Carolina (UNC) basketball center Brendan Haywood steps to the free-throw line with only 1.2 seconds remaining in a game on archrival Duke University's home court. Haywood sinks both free throws, and after Duke misses a last-second basket attempt, UNC wins. For those teams' rabid fans, it's the biggest upset in the history of the heated matchup since — well, since when? To find the answer, fans might take to searching the Web for statistics on the longtime rivalry.

Until recently, they wouldn't have found answers easily; searching for statistics on the Web has been futile. Though the information is somewhere out there, it's probably on multiple, unconnected pages. No search engine has been able to stitch the relevant statistics together.

But new technology is beginning to change the rules for searches. For the first time, users schooled in the intricacies of the Boolean search language's *ands* and *nots* are using natural language. They're also relying upon tools that can recognize images, search statistical databases and extract relevant information from unconnected sources. These features are appearing not only in online search engines such as Excite@Home or Seattle-based sports site ESPN.com, but also in venerable enterprise content-management software, for searching corporate documents and knowledge bases.

Point technology improvements are steps toward a greater goal. Someday, a search engine will be able to intelligently extract context from any question, find the information it needs from various sources and then present it in a usable format. Susan Feldman, an analyst at IDC in Framingham, Mass., calls this state of search nirvana "the answer machine"— ask anything on a search engine, and it finds the answer. Until that halcyon day, there are some new point technologies that could make corporate and Web searching slightly easier.

FUN WITH NUMBERS

Given the importance of statistics in sports, it's no wonder that ESPN.com, which receives about 2.5 million page views per day, wanted a statistics-friendly search engine for its site. For years, the company had been asking, "How do we get into a less-structured query environment?" says Geoff Reiss, senior vice president of programming, production and operations at ESPN Internet Group, which is part of ABC Inc. in New York.

The problem is that most search engines can't analyze charts and databases; they can only note frequency of words. But word groups don't necessarily add up to real concepts.

ESPN began using services from Fact City Inc. in Waltham, Mass., last year to enable searches for statistics from professional sports leagues or college athletics.

"What we can do now is create comparisons and [provide] context," says Reiss. The ultimate goal, he adds, is to replicate the moment "when a baseball fan picks up the baseball encyclopedia and gets lost in the serendipity of it." Although that isn't yet a reality, during last year's NCAA college basketball tournament, some ESPN users literally spent hours searching through the Web site's collections of statistics.

Fact City functions like an application service provider. First, it writes a data dictionary that explains the relationships between things in a given database. So if a user requests "Walter Payton career yards," the search engine knows to reference football statistics and display the former Chicago Bears running back's passing, receiving and rushing yards.

Fact City receives search requests from client Web sites and then sends the answers back via Web protocols HTTP and XML so client sites can display results via their own Web pages and maintain site design. Fact City works with free databases such as the CIA's *World Factbook*; proprietary corporate databases for in-house searches; and licensed proprietary databases, like that of Zagat Survey LLC in New York for restaurant reviews.

Users of Web search engines, corporate knowledge tools or even local library catalog computers know that every search engine seems to use different input rules. Some tools require the word *not* to exclude certain results from a query, while others require a minus sign. The whole approach is flawed. Search engines "give you what you ask for, but the critical problem is most people don't know how to write the right question," says Feldman.

The solution is natural language processing, which can interpret user requests by comparing them against dictionaries of definitions and concepts, thus eliminating the need for special query terms. That way, users searching for information about "high blood pressure" would benefit from medical literature that instead classify it as "hypertension."

The goal, of course, is to be able to enter into a search engine a request such as: "Discern the recent hiring habits of my five biggest competitors."

Though that ability doesn't yet exist, the necessary pieces are beginning to appear. For instance, new software from iPhrase Technologies Inc. in Cambridge, Mass., lets companies search through their structured information (databases) as well as their unstructured information (documents and Web pages).

"It uses a natural language search to find the most appropriate page within a site, or if they can't find it, they fabricate a page from site information," notes Guy Creese, an analyst at The Yankee Group in Boston.

At The Charles Schwab Corp. in San Francisco, Bob Sofman, senior vice president of the firm's electronic brokerage, says the iPhrase engine running on Schwab.com is often used to quickly compare the market capitalization, price/earnings (p/e) ratio and revenues for different companies. For instance, the engine can respond correctly to queries such as "find the p/e ratios of the top five trading stocks today" and return all relevant information, report-style, on one page.

RELEASE THE HOUNDS

While search engines are getting better at indexing text and documents with ease, when it comes to searching images and video, most engines are stuck searching the text that describes the image. This lackluster, secondhand information is often absent or vague.

The Quest for Easier Answers Continues

New search engines are changing the rules for searches of Web sites and corporate databases to help users more easily obtain information.

COMPANY	KILLER FEATURE(S)
ClearForest	Context analysis
Ereo	Pixel-level image analysis for recognition
Fact City	Searching statistical information
iPhrase	Natural language; stitching multiple results together
Inxight	Categorizer files documents in hierarchy
Oingo	Drop-down boxes for context
Solutions-United	Context analysis

However, new search engine software, such as that from Ereo Inc. in Westminster, Colo., is beginning to analyze the actual images on a Web page in order to deduce what's in them. The technology can even be used for blocking or finding nude images on the Web.

Search portal Excite@Home, also known as At Home Corp. in Redwood City, Calif., is using Ereo's software to let users search the Web for images.

Another early user is Minden Pictures Inc., an Aptos, Calif.-based stock photography agency with more than 250,000 wildlife images from a select group of *National Geographic* photojournalists.

The company's president, Larry Minden, says he's using Ereo to let people who search his Web site narrow their searches visually, rather than textually. When users find an image, they can click "more like this," so even if they don't know what they're looking at — a Bengal tiger, as opposed to a Siberian, for instance —they'll get the results they're looking for.

Instead of requiring that every image be named, Ereo can actually analyze images to understand what they are. In other words, with some tweaking, not only can it differentiate between breeds of dogs, but it can also tell if a dog is running or sitting.

"There's a default weighting of different criteria, but if you have different needs or interests, you can further weight the color or hue, as opposed to just the meta tags," says Minden. Other adjustable search criteria include shapes, textures and backgrounds.

No search tool is perfect, but improved searches can improve revenue. For instance, image requests for "horse" can return many pages of results. Minden says customers typically will look only at a handful of results pages and then either phone his company or go elsewhere. So "if you can find a way that's going to bring what you really need up to the top five pages [of results] from 500 pages, you're going to have much better customer satisfaction," says Minden.

FUTURE SEARCH

New technologies are going even further than image searching. Los Angeles-based Oingo Inc.'s search site gives users drop-down boxes to select what they really mean to say. "It's very simple to go back to a user and ask, 'Do you want a 'jaguar', the animal, or a 'Jag' car?' " says Feldman.

Concept mapping, which is just beginning to emerge, can understand concepts — that *pool hall* also means *billiards* but not *in-ground pool* — to produce better results.

For instance, tools from firms such as ClearForest Corp. in New York and Solutions-United Inc. in Syracuse, N.Y., can analyze text and decode context, such as whether an e-mail has an irate tone, to determine a customer's frustration levels. It can also tell whether someone is searching for a printer for their children or for their home office.

Xerox Palo Alto Research Center spin-off Inxight Software Inc. in Santa Clara, Calif., just launched Categorizer, a program that can assign corporate documents to predefined subject categories to produce a Yahoo-like hierarchy. That's useful for an analyst who only needs a subset of 200 documents but would otherwise have to read them all. Documents aside, someday, analysts will be able to just read — and trust — the summary. ◗

Quiq Builds User Communities Online

Software lets internal staff and external experts answer customer support queries

BY AMY HELEN JOHNSON

WHEN ECHIPS Inc., a content and commerce Web site for electrical engineers, started a public knowledge base about computer chips, it faced a problem. The company had plenty of outside experts volunteering to answer questions, but it had little infrastructure to support their efforts, says David Blaza, vice president of content operations at eChips in San Jose.

An engineer would send a question via e-mail, and one of the experts would answer it by posting the question and a response on a static Web page — a process that was downright user-unfriendly.

EChips now uses Quiq Connect, a hosted customer service application and knowledge base from San Mateo, Calif.-based start-up Quiq Inc. The move has brought organization and much-needed features such as a search function, Blaza says. The site is more usable, traffic is up, and Blaza has been able to attract advertising to the site.

Enabling input from external contributors makes Quiq Connect different from most other customer service applications, says Quiq President and CEO Greg Richardson. By delivering an infrastructure that provides access and management for experts both inside and outside the company, he explains, Quiq enables a company to turn its extended network of service specialists, business partners, distributors and customers into a collaborative help desk community that lowers support costs and increases the quality of the knowledge base.

Chris Martins, an analyst at Aberdeen Group Inc., a research firm in Boston, describes Quiq's value with the old adage that the whole is greater than the sum of its parts. "There's a lot of talent and experience amongst your customers and partners that augments the enterprise knowledge," he says.

By allowing companies to tap that talent and experience, Quiq can deliver better customer service. And Quiq uses a threaded message format so it's easier for users to follow the logic of its back-and-forth conversational mode, Martins says.

The technology that powers Quiq is a relational database with a series of customized layers on top of it, says Raghu Ramakrishnan, Quiq's cofounder and chief technology officer. Certain layers provide intelligent organizational and tracking capabilities for updating the database, while an advanced search-and-retrieval layer combines techniques from SQL-based queries and text-based searches to produce highly relevant answers to questions, he says. Users can rate the answers and the contributors; the system uses those ratings to choose which answers it offers first.

Blaza credits some of Quiq's advanced features with drawing users to his site. For example, when users want to track a particular expert's advice, they can subscribe to that person's answers and receive e-mail when new postings appear. Experts can post diagrams to illustrate their answers, which is especially valuable for Blaza's community of engineers.

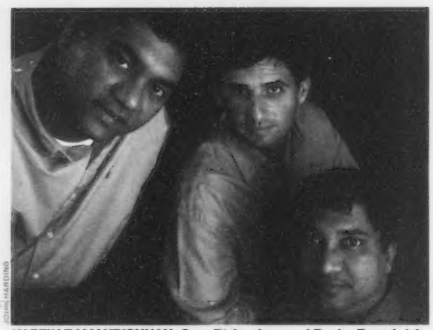
Quiq also includes features for managing the public environment, such as keyword filters that trap undesirable or vulgar postings, Richardson says. The system's moderator can look at content at any time and handle troublesome postings or participants.

Back-End Issues

Blaza plans to use these advanced management features in the future. But first, he wants to integrate Quiq with eChips' internal content management systems so a user reading about a knowledge-base topic sees a link to related Quiq question-and-answer threads. Blaza anticipates that the integration won't be difficult because Quiq has good application programming and integration interfaces. Quiq's import/export framework for integration handles about 95% of the work automatically, claims Ramakrishnan, but he adds that the customer's IT department usually needs to do some customization.

Nonetheless, integration is an area that needs improvement, Richardson says. And he acknowledges that Quiq Connect doesn't leverage the data it captures very well. To help address that problem, a feature to be released this year will let companies offer their users different support levels, including a standard access level that's limited to certain areas of the knowledge base and a premium support level that gives users access to more information. ◗

Johnson is a Computerworld *contributing writer in Seattle.*



JOHN CARROLL

KARTIK RAMAKRISHNAN, Greg Richardson and Raghu Ramakrishnan say their tool builds an extended product support community.

Quiq Inc.

Location: 2121 South El Camino Real, 10th floor, San Mateo, Calif. 94403

Telephone: (650) 294-2900

Web: *www.quiq.com*

Niche: Web-based self-help customer service application

Why it's worth watching: Collaborative capabilities allow responses from external experts, forming an online support community.

Company officers:
- Greg Richardson, president and CEO
- Raghu Ramakrishnan, cofounder, chairman and CTO
- Kartik Ramakrishnan, co-founder and vice president of business development

Milestones:
- 1998: Company founded
- April 2000: Quiq Connect introduced
- January 2001: Version 2 released

Employees: 60; 100% annual growth

Burn money: $15 million from BancBoston Ventures Inc., Discovery Ventures, Altos Ventures and InterWest Partners

Products/pricing: Quiq Connect installation costs range from $30,000 to $60,000; monthly usage fees range from $20,000 to $55,000.

Customers: AlphaSmart Inc., Ask Jeeves Inc., eChips, National Instruments Corp. and Packtion Corp.

Partners: Blue Barn Interactive Inc., Idea Integration Corp., Participate.com Inc. and Quaero LLC

Red flags for IT:
- Requires customization to integrate with back-end content management systems.
- Current user access is all-or-nothing; there's no tiered access model.

COMPUTERWORLD emerging companies

[the buzz
STATE OF THE MARKET]

A Market in Questions

Chris Martins, an analyst at Aberdeen Group, says collaborative customer service applications like Quiq Connect, which can deliver rapid answers to customer questions, are here to stay. "It's an important and emerging market area," he says. Aberdeen projects that this year's customer service software sales will be approximately $7 billion.

Sharon Ward, director of enterprise business applications at Framingham, Mass.-based market researcher Hurwitz Group Inc., says Quiq is riding the trend toward cutting customer support costs by providing online self-help. "It's hitting the right place at the right time," she says. But Ward warns that the company's technology doesn't give it a sustainable competitive advantage.

Quiq's current competitors are small firms, although CEO Greg Richardson says he expects to see new start-ups and large companies, like San Mateo, Calif.-based Siebel Systems Inc., enter the market.

Orbital Software Group Ltd.

Edinburgh
www.orbitalsoftware.com

Orbital's Organik software has features similar to Quiq Connect's, with search capabilities, answer ratings and e-mail notifications. Outside experts can also contribute.

Broad Daylight Inc.

Santa Clara, Calif.
www.broaddaylight.com

The company's Broad Mind offers a Web interface for customer questions. It then routes e-mail to the appropriate expert, who publishes the answer by replying to the e-mail. It doesn't allow outside experts to contribute. Customers can buy the software or use it as a hosted service.

RightNow Technologies Inc.

Bozeman, Mont.
www.rightnow.com

RightNow Web [Technology, Jan. 7, 2000] automatically handles e-mail queries and provides a knowledge base of questions and answers, but only internal experts can provide answers. It supports chat sessions and online surveys to capture customer statistics. It's available as software or as a hosted service.

– Amy Helen Johnson

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Woes of the Wireless Recruiter

The IT job market may be cooling, but demand for skilled wireless programmers is hot. Companies can't get enough of these workers, whose salaries are going sky high. By Julekha Dash

TALK TO YOUR average recruiter, and you're likely to hear that companies are no longer willing to give IT workers the star treatment. That's no surprise, considering the slowing economy and a greater pool of workers available due to layoffs.

But then there's the wireless space. Charles Moore, president of Active Wireless Executive Search Group in South Daytona, Fla., says one company recently paid him a recruitment fee of $140,000 to find a single executive: a chief operating officer for a wireless vendor. Another company spent $750,000 to find just four staff members.

If you've figured out that wireless is hot, you've figured right. And getting exposed to a technology that's fairly new can be a wise career move for IT workers.

Entry-level wireless programmers can earn $45,000 to $55,000 a year, and programmers and architects with a few years of experience can earn as much as $150,000, according to recruiters.

"It's always a good career move to be on the cutting edge," says Dexter Taylor, a New York-based wireless architect and contractor. But Taylor warns that IT workers should also beware that there's a "good amount of hype" in the arena as well.

Taylor, who has been working as a contractor for a year, previously worked as a senior technologist at New York-based consulting firm Razorfish Inc. Taylor says he entered the wireless fray because he "saw pretty clearly that the number of wireless devices is only going to grow."

And wireless projects present more opportunities than just developing applications for cell phones, says Taylor. They could involve developing software for mobile devices used at the point of care in hospitals, for instance.

Resources
- www.wirelessresumes.com
- www.trainingwireless.com
- www.wiwc.org (Women in Wireless Communications)
- www.activewireless.com (wireless recruiters)

In many cases, IT professionals with experience in Web development or networking can easily make the leap into wireless, says Evan Crawford, executive director of the center for e-transformation at The Children's Hospital of Philadelphia.

Crawford says Children's Hospital sends its staff to obtain wireless certification training to learn new skills.

People who want to work for wireless carriers can come from a variety of backgrounds, says Moore. For example, someone could leverage experience at an e-commerce company, a bank or an Internet service provider to get a job as director of billing and fraud systems at a wireless carrier.

"You can transplant someone like that into a wireless environment. The concepts are still the same," he says.

But firms that sell wireless infrastructure are looking for individuals who have worked specifically on wireless projects or at a telecommunications firm, says Moore. Wireless infrastructure providers deliver the radio base stations and software that allow the devices to talk to one another.

Acquiring the Talent

Because the wireless market is so new and constantly changing, many end-user companies have chosen to outsource wireless application development. Clearly, some leading companies, such as Memphis-based FedEx Corp., develop applications in-house. But most end users keep a few database administrators and programmers to "manipulate software" rather than actually develop it, says Moore.

Organizations such as Winston-Salem, N.C.-based bank Wachovia Corp., the Washington Redskins football team and Toledo, Ohio-based Owens Corning have chosen to outsource wireless development rather than develop it in-house [Page One, Feb. 5].

Alan Griver, chief technology officer at wireless Internet provider Go-America Communications Corp. in Hackensack, N.J., says it's hard to "find really talented developers with a thirst to learn something new."

His recruiting strategies include attending industry trade shows and writing magazine articles. Often, high-caliber applicants respond to his writings and engage Griver in conversations about the wireless industry. He taps those individuals for interviews.

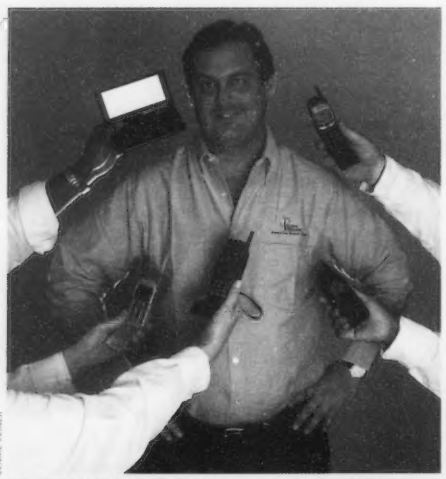
"A thirst for knowledge is key, since the wireless industry is changing every four months," Griver says.

He also allows his team of about 50 developers the option of telecommuting. Go-America developers live in New Jersey, where the company is based, as well as California, West Virginia, Texas and Washington but visit the main office once every four to six weeks. "It's important that you have strong project management and source-code control," Griver says.

Moore says telecommuting in the wireless industry is growing at a pace of 80% or more per year. For example, a company with five telecommuters last year may have nine or 10 work-at-home wireless programmers or architects this year.

Allowing that kind of flexibility may be the best way to attract top talent, he says. For example, one of Moore's clients in Little Rock, Ark., recently hired an IT professional who lives in Boston.

"If you're from Boston, can you see yourself relocating to Little Rock? That would be pretty difficult," Moore says.



JENNIE ZEINER

THE WIRELESS MARKET IS HOT, says recruiter Charles Moore.

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CONFERENCE AGENDA

SUNDAY, MAY 20

12:00 - 5:00pm
GOLF TOURNAMENT FOR PRE-REGISTERED ATTENDEES

7:00 - 8:30pm
PRE-CONFERENCE EVENING NETWORKING RECEPTION

MONDAY, MAY 21

7:00am - 8:00am
BUFFET BREAKFAST

8:00am

WELCOME & OPENING REMARKS
Alan Guibord, CEO, Computerworld
Maryfran Johnson, Editor-in-Chief, Computerworld

8:15am

OPENING KEYNOTE: GOING DIGITAL THE OLD-FASHIONED WAY: GM'S LEVEL-HEADED APPROACH TO E-BUSINESS
Ralph Szygenda, CIO, General Motors

9:00am
PANEL 1:
IT'S MISSION IMPOSSIBLE: GLOBALIZATION AND E-BUSINESS
Panel Moderator: Sarwar Kashmiri, CEO, EbizChronicles.com

Ready or not, the Web is making the globalization of business a reality. But pursuing a global strategy means more for IT than creating a worldwide network infrastructure, setting up foreign distribution or hiring IT talent abroad. So how does an IT Leader go about getting a grip on strategy to support the enterprise's global business objectives? Our panel will share its collective international experience to send you off with a host of good ideas along with an action-item list.

10:00am
BREAK

10:15am

OLD RULES, NEW GAME: BUILDING PRUDENTIAL'S GLOBAL E-STRATEGY
Irene Dec, VP International Investments, Prudential Insurance

11:00am
PANEL 2:
THE NEXT WAVE OF E-COMMERCE: CONNECTING YOUR CUSTOMER CHANNELS
Panel moderator: Kevin Fogarty, Business & Technology Editor, Computerworld

The customer economy has arrived with a vengeance, trailing massive numbers of Customer Relationship Management (CRM) systems in its wake. But integrating disparate CRM applications and re-architecting workflow to get that mythical 360-degree view of the customer remains a major hurdle for IT. Are you tying all of your customer channels together — in realtime — to leverage existing investments in front-office and legacy applications? This panel will bring together diverse industry views on a topic that ultimately affects every company's bottom line.

12:00pm
INTERACTIVE LUNCH: RECRUITING & RETAINING TOP TALENT

1:30pm

AFTERNOON KEYNOTE: SURVIVING THE REVOLUTION AND THRIVING IN THE CUSTOMER ECONOMY
Patricia Seybold, CEO, Patricia Seybold Group and Author of "Customers.com" and "The Customer Revolution"

2:15pm
PANEL 3:
WIRELESS WARRIORS AND THE CHALLENGE OF M-COMMERCE
Panel moderator: Bob Brewin, Senior Editor, Wireless Technology, Computerworld

Few technologies hold as much promise — or pose as many perils — as wireless networks and mobile computing. What are the best practices in deploying mobile commerce applications that resolve security concerns and location-service controversies? Which applications make the most sense for wireless LANs? How do you choose an architecture that works well for your user base? How solid is the Wireless Application Protocol (WAP) standard for unifying handheld devices and wireless networks? Our panelists will examine these core questions through the lens of their own experience, coming up with some practical recommendations for the next wave of wireless warriors.

3:00pm
BREAK

3:10pm

CLOSING KEYNOTE: THE ABILITY TO RISK INNOVATIONS
Chet Huber, President, OnStar

3:55pm
CLOSING REMARKS

4:00pm - 5:30pm
SPONSOR BREAKOUT SESSIONS

5:30pm - 8:30pm
COCKTAIL/NETWORKING RECEPTION
EXPO & BUFFET DINNER

TUESDAY, MAY 22

7:00am - 8:00am
BUFFET BREAKFAST

8:00am
OPENING REMARKS
Alan Guibord & Maryfran Johnson

8:15am

OPENING KEYNOTE: IT LEADERSHIP IN A CHANGING ECONOMY
Doug Busch, CIO, Intel

9:00am
PANEL 4:
THE HEAVY HAND OF UNCLE SAM IN ONLINE SECURITY AND PRIVACY PROTECTION
Panel Moderator: Alan Paller, Research Director, SANS Institute

Wherever technology touches its citizens these days, the U.S. government seems to be there with new regulations or proposed legislation. The high-tech sector remains split about how to approach online privacy guarantees in the U.S., while the European Union has already adopted tough data protection laws that multinational companies must follow. Our expert panel will talk about strategies for keeping a step ahead of Uncle Sam in this uncertain, potentially explosive, regulatory environment.

10:00am
BREAK

10:15am

PRIVACY - IT'S NOT JUST A COMPLIANCE ISSUE
Eddie Schwartz, VP of Strategy, Guardent (former Chief Security Officer, Nationwide)

11:00am
TOWN HALL MEETING: "ASK THE CAREER EXPERTS"
Maryfran Johnson

12:00pm
EXPO & BUFFET LUNCHEON

1:30pm

AFTERNOON KEYNOTE: THE BEST OF BOTH WORLDS: THE SYNERG BETWEEN OPERATIONS AND IT
Laura Olle and Marge Connelly, Co-CIOs, Capital One Financial

2:15pm
PANEL 5:
THE NEW ROI: TRACKING TECHNOLOGY PAYBACK IN A TOUGH ECONOMY
Panel Moderator: Julia King, Executive Editor, ComputerworldROI

Now is the time to recession-proof your IT organization, generate some new ideas and find new revenue streams. How is your company using the Internet to streamline processes within the organization and deal more effectively with your supply chain? Are you creating online relationships with partners and competitors alike? Where can you use IT to create new products and services? Getting focused on the real business opportunities and the ROI behind technology expenditures is the mission of this panel.

3:15pm
BREAK

3:25pm

CLOSING KEYNOTE: ESSENTIAL INGREDIENTS FOR B2B MARKETPLACE LIQUIDITY
Harvey Seegers, President/CEO, GE Global eXchange Services

3:55pm
CLOSING REMARKS
Alan Guibord & Maryfran Johnson

4:00 - 5:30pm
SPONSORED BREAKOUT SESSIONS

7:00pm
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JEFF TAYLOR
CEO, MONSTER.COM & CEO, TMP INTERACTIVE

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JULIE CUNNINGHAM
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KEN GAFFEY
STAFFING CONSULTANT

Technology 2001
SUSAN HODGES
SEMCO ENTERPRISES, INC.

Update on Immigration Laws Affecting Your Professional IT Staff
HARRY JOE, ESQUIRE
JENKENS & GILCHRIST

Xtreme Recruiting: How We Got Here and Where We Go from Here
MICHAEL MCNEAL
PURECARBON

Best Practices of Retention
CATHY PETERSON
ANALYSTS INTERNATIONAL

Retention: Who's Responsible & How to Improve It
KEVIN WHEELER
GLOBAL LEARNING RESOURCES, INC.

Automated Screening: Guaranteed Success or Formula for Failure?
DR. WENDELL WILLIAMS
SCIENTIFICSELECTION

Panel Discussion: Diversity - What You Need to Do to Tap "All" the Top Talent
PRESTON EDWARDS (MODERATOR)
IMDIVERSITY.COM

Panel Discussion: What You Really Need to Know About Resume Management Systems or, How to Tell "Real Ware" from "Vaporware"
MARK MEHLER (MODERATOR)
MMC GROUP

Town Hall Forum: Pundits, Puns and Pulled Punches
MARK JESKE (MODERATOR)
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Software Engineer: Responsible for full life-cycle development of new features for the Requirements Management Business Unit. This includes requirements of analysis, design, implementation, testing and releasing software for RequisitePro. Requires BS CS or related & 5 years experience in job offered/Computer Programmer. Special requirements include: Knowledge/exp. with Visual Basic COM-based programming; DBA functions in Oracle & SQL Server databases; & object-oriented design using the Unified Modeling Language (UML). Salary: $78,052/yr. 40 hrs/wk. Job/intrvw site: Boulder, CO. Send this ad and your resume/letter of qualifications to Job # JL1117753, Colorado Department of Labor & Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117. Must have proof of legal authority to work in the U.S.

Software Engineer, Senior Embedded-Design and develop new embedded software components under pSOS. Maintain and enhance existing software components. Analyze, design, and develop improvements to existing software products. Support diagnostic activities and determine solutions to complex or unusual software problems. Support efforts of development and validation testing activities. Develop technical documentation in support of product development and release. Duties entail work with DSET Toolkit, GDMO, TMN, CMIP, OSI Networking, C++, Unix, and Embedded Systems Programming. Reqs: Bachelor's (or equivalent) in Computer Science or Electrical Engineering & 29 months exp. in the job offered or in related occupation of Software Engineer. Previous exp. must involve work with DSET Toolkit, GDMO, TMN, CMIP, OSI Networking, C++, Unix, and Embedded Systems Programming. 40 hrs/wk, M-F 8:00-5:00; OT: N/A. $69,652/yr. Job location: Alpharetta, Georgia. Mail two resumes or apply in person: North Metro, Job Order #GA 6944679, 2943 N. Druid Hills Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office. Must have proof of legal authority to work in the U.S.

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IT careers

IT Careers in Software Development

Software developers are among the most sought-after and competed for employees. They are the employees who brought about customized compensation offerings and whose needs frequently have created improvements in employer/employee relations for everyone.

Software development is the landing zone for creativity and innovation, where employees have the chance to develop entirely new things and reinvent the way business operates.

Acxiom Corporation
Little Rock, AR

Rasesh Patel, business unit leader at Acxiom Corporation, says the software challenge for the future will be in focusing on the most critical needs customers have. "For someone in software development, that will mean needing to focus on the absolutely most critical skill sets," he says.

Patel knows because his company continues to develop software solutions that enable companies to drill ever more deeply into the data they have about their business and use it to create still more success.

The company has a core of software capabilities in its flagship products – AbiliTec, InfoBase and Solvitur[4]. InfoBase provides a comprehensive overview of market data, while Solvitur[4] facilitates real-time customer knowledge, across multiple touchpoints (Internet, call center and retail outlets – concurrently). AbiliTec expanded in February with a new family of services based on AbiliTec software. These include a process to help companies comply with new privacy laws while continuing to build customer relationships.

"We have a good outlook in terms of projects," says Patel. "We are redefining how customer relationship management will be done in the future. Our customers will be able to use these capabilities to look for totally new business opportunities and markets."

Acxiom is hiring people with strong experience in building database solutions, parallel and distributed computing with a focus on performance, and development of customer solutions. "We also look for associated skills in communication, leadership, a results-orientation and someone who seeks continuous improvement and learning," says Patel.

"To fit Acxiom, you must be interested in your own career by having clear goals about where you want to be and taking charge of that future," Patel explains. "This is a company that revolves around profitability and customer and associate satisfaction. The associate satisfaction comes from meeting your needs in term of career goals, so you must be clear as to what they are. We measure satisfaction because we know it goes hand-in-hand with profitability and customer satisfaction, and we insist that it improves year over year."

Acxiom is a flat organization where people fill roles, not titles or jobs. "This immediately breaks down some barriers because everyone here must be a leader," Patel says. "We work across boundaries to form teams to get work done – that's our bottomline."

ALLTEL Corporation
Little Rock, AR

Faith Hill stars in ALLTEL's current advertising campaign, but this Fortune 500 company shines brightly on its own in the IT world. ALLTEL began more than 50 years ago as a local telephone company, adding IT for financial services companies, mortgage providers and the telco industry three decades ago. In the mid-1980s, the company transformed again, this time becoming a leader in enterprise networks and wireless communication.

Headquartered in Little Rock, the company also has locations in Atlanta, Cleveland, Charlotte (NC) and Jacksonville (FL), as well as other domestic and global sites. Karen Huber, director of employment in Little Rock, says the company's work in software is a never-ending cycle. "We develop continuously, enhancing what we have but also responding to new requirements and technologies." Primarily, ALLTEL's IT projects involve the world of finance, providing services such as home banking, and anything that a retail financial institution offers to customers. "Our IT products are not visible to the general public, but our web-based development drives the capability for our customers and their customers," says Huber.

The company has openings in distributed computing, network architecture and design, database and LAN design, client/server development and business analysis. ALLTEL hires several thousand people each year companywide (7,000 in year 2000), including new college graduates who go directly into training. "We look at a candidate's educational degree, experience and performance, but we also want people who can come in and work directly with our customers, who have strong communication skills and the ability to work as part of a team."

ALLTEL has shifted from primarily classroom-based training for employees to a mix of web-based, computer-based and classroom training. "We work with employees to create a career path and individual development plan," says Huber. "We want to know where they want to be in five years and then plan on how to get them there.

"We believe people come to ALLTEL because they can have a full career here. We have technical and industry options for IT professionals such as our global operations, telecom operations and the wireless operation," she adds. "Add to this that we are a friendly place to work where we balance a high level of customer service with a high level of providing for employees."

CrossWorlds Software, Inc.
Burlingame, CA

CrossWorlds delivers high-speed integration to customers ranging from The Dow Chemical Company to Whirlpool. The company's presence in the telecommunications arena increased by 92 percent in 2000, and CrossWorlds was named by *Computerworld* magazine as one of the "Top 100 Emerging Companies to Watch in 2001."

The rave reviews are based on the company's ability to decrease long-term IT maintenance costs, while enabling faster integration within the enterprise and across the Internet. Robin Rea, employment manager at CrossWorlds, says this is possible because of the company's patented architecture, a unified integration platform for e-business and a true end-to-end solution that is unmatched in its speed of implementation. "Our goal is to connect all the software a customer uses, to streamline their processes and to assure that the external face of information for customers and partners is real-time and consistent," Rea says.

The service rests on CrossWorlds' engineering department. "We develop and implement a full suite of business integration software that unites and extends business processes," says Rea.

"In addition to the focus on training and professional expertise and growth, CrossWorlds is a well known and well-respected company," she adds. "That's a great environment in terms of what you want to do. We're innovative and allow individuals to be creative, to do what you can to enhance and develop products."

IT careers

For more job opportunities with software development firms, turn to the pages of ITcareers.

- **If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.**
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Offshore Digital Services seeking candidates with commercial experience in the areas listed below:

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Offshore Digital Services provides competitive salaries, benefits, and a bonus program designed to encourage long-term employment and increased customer revenue. Interested? Send a detailed resume with cost applied for, education background, project experience, and geographic preferences to:

The Personal Manager Offshore Digital Services, Inc.
14798 Wicks Boulevard San Leandro, CA 94577
Fax: 510-483-1819 Email: personnel@odsi.com

OFFSHORE DIGITAL

Senior Member, Technical Staff (S/w Engineer). Design & implement O-O-based products & solutions to support clients' business needs; assume responsibility for service accuracy & timeliness. Research, design, develop, & implement s/w sys for medical, industrial, & scientific apps in O-O analysis & design, Smalltalk & Visual programming, & general Object Tech, using complex programm. techs, math. models, systems analysis, design methodologies. s/w dev tools, & programming logic. Frequent travel & extended hotel/corporate apartment stays away from home. Due to client locations throughout U.S., nationwide transfers possible. Req: MS, Comp Sci, CIS, Bus Admin (w/CIS concentration), or related (or, alternatively, BS in sim field & 5 yrs progressively responsible exp); & 5 yrs exp w/ OO dev (Java or Smalltalk), & info systems or s/w engg (a BS in Comp Sci may subsitute for 1 yr of this req, & an MS for 2 yrs); 2 yrs exp. using Smalltalk Envy, Object databases, & responsibility-driven design; & 1 yr exp. w/ at least 2 O-O methodologies. Exp. may be gained concurrently, 40 hrs/wk. $75,000/yr. Please apply in person w/ resume in hand to any Kansas Job service Career Center for the following job order: KS2300161, or submit resume to KDHR, Division of Employment & Training, 401 SW Topeka Blvd., Topeka Blvd, Kansas 66603, attention: Jane W. Burbridge. Be sure to include the referenced job order w/ resume. Applicants must have proof of legal authority to work in the United States.

Sr. Software Engineer sought by software consulting company in Denver, CO, to work in Sugarland, TX & other unanticipated job sites in the U.S., to, at a senior level, engage in full life-cycle software development. The software applications incorporate client/server technology &/or are web-based,& interface with ORACLE & SQL/Server relational database management systems. Analyze requirements. Create designs & design documentation. Code, test, implement,& debug the software applications. Use JAVA, HTML, Pro*C, Stored PL/SQL, PowerBuilder,& the Seibel ERP front-end management tool in the design & development process. Project management as required. Requires Master's or equivalent in Computer Science or related field (including Computer Applications). Specifically, the position requires a Master's, or foreign equivalent, plus 3 yrs of progressively responsible full life-cycle software development experience in a client/server environment using ORACLE & SQL/Server, or a Bachelor's, or foreign equivalent, plus 5 yrs of progressively responsible full life-cycle software development experience in a client/server environment using ORACLE & SQL/Server. Working knowledge of HTML & Stored PL/SQL. $66,100/yr; M-F; 8am-5pm.(5 openings)Respond by resume to James Shimada, Colorado Dept of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202,& refer to Job Order No.JL1117849.

Job # 200338–Software Engineer –Develops software systems, applying computer science and mathematical analysis using: Java, Perl, C and VBScript. Analyzes software requirements and performs user training after development. Must have a bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. Must have at least one year of experience as a applications programmer with Java, Perl, C and VBScript. . 40 hrs/week, 9:00am-5:00 pm, $58,000.00/yr. Send Resumes to MDCD/ESA, P.O. Box 11170, Detroit, MI 48211 - 1170, referencing the above job number. This is an employer paid ad.

Multiple positions available in a software consulting & development company in Fremont, CA.

Programmer Analysts-to plan, develop, test & document computer programs using latest computer programming techniques & languages including: AS/400, OS/400, CL/400, Pathfinder (Hawkeye), UNIX, Shell Programming, Informatica Designer, Server, Brioquery, Redbrick, ORACLE 8.1 SQLT, RISQL, BPCS, ILERPA.

Sr. & Jr. Software Engineers-to search, design & develop effective computer software systems using latest computer languages & tools such as: LotusNotes/Domino development, Visual Basic, Javascript, VBScript, XDIFF, Windows NT/95 environment.

Application Programmers-to design, conduct maintenance and coding on specific computer modules, develop screens using computer programming languages including: PowerBuilder 6.5, Oracle 8.0, Windows NT.

Computer Programmers-to convert data from project specifications to create or modify computer programs using Visual Basics, Java, JDK, JavaScript, JSP, EJB, JDBC/ODBC, Corba, C++, ORACLE, UNIX/Solaris, NT.

Must have MS/BS in Computer Science or related fields plus relevant exp. Send res & cov ltr to Aroon Dinesh Guidibande, CFO, Kirloskar Computer Services, Ltd, 38950 Blacow Rd., Suite F, Fremont, CA 94536. (510)505-1855.

Capital Stream seeks Dev. Team Mgr. for Sea. office. DESC: Manage. proj. dev. team of s/w engineers in full life cycle s/w dsgn. & dev.; Determ. s/w & h/w arch.; Dsgn., dev. & enhance web based e-com. apps. to access info. stored on RDBMS util. SQL, ASP, VBScript, JScript, XML, & COM on WinNT o/s; Coord. w/prog. & prod. manag'mnt to establish & meet sched. & deadlines & to ensure prod. meets specs. & req'mnts. REQS: BS in C.S., Eng., Math or Phys. + 3 yrs. of proj. mngmnt exp. directing proj. dev. teams thru full life cycle s/w design & development & dsgn. & dev. RDBMS & related dist. apps. util. SQL, VBScript, JScript & COM on WinNT o/s. Prem. salaries offered + bns, benes., & options. Pls. reply to Human Resources, Job #CS-101, 501 North 34th Street, Seattle, WA 98103.

Senior Technical Consultant sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, implement & integrate enterprise resource planning software that runs on AS/400 & client/server platforms. Design & develop interfaces to integrate company software applications with client's existing systems & applications. Design & develop enhancements & modifications for software applications. Trouble shoot & resolve any problems that arise during implementation process. Provide user training & support as required. Solve & trouble shoot any bugs or issues. Analyze business processes to make sure the software applications & modules are consistent with those business processes. Requires a Master's degree or equivalent- specifically, it requires a Master's degree in computer science, engineering, or a related field (including chemical engineering) plus 3 years of progressive experience in design & development of client/server ERP software applications (the 3 years of progressive experience can be gained either prior to or after the Master's was earned), or a Bachelor's degree in computer science, engineering, or a related field (including chemical engineering) plus 5 years of progressive experience in design & development of client/server ERP software applications. 8am-5pm, M-F; $85,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117880

Senior Technical Consultant sought by company specializing in business software solutions in Denver, CO to work in Atlanta, GA & other unanticipated job sites in the US. Implement & install client/server & web–based Enterprise Resource Planning (ERP) software applications at client sites. Integrate the ERP software applications with new or legacy software applications, with relational database management systems,& with network operating systems. Configure relational database management systems. Enhance & modify software applications to meet the specific needs of the client. Engage in performance tuning & business process re–engineering. Troubleshoot & resolve problems & issues that arise during the implementation process,& provide user training & support. Prepare technical documentation. Use C,C++,JAVA,& other tools in the development process. Engage in application development &/or project management as required. Requires B.S. or foreign equivalent in comp. sci. or related field; 3yrs.exp.installing & implementing ERP software applications, including configuring relational database management systems; working knowledge of programming language C & multiple (two) network operating systems (Ex: Windows NT,UNIX, AS/400,etc.). 8am-5pm, M-F; $83,000/yr. (2 opgs.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117742.

COMPUTER CONSULTANT. 40 hours per week, $63,000 per year. Analyze, design, develop and test software for various commercial clients. Reach solutions for user requirements, develop new systems with an object-oriented approach. Manage database and application servers. Requires Bachelor's degree in Engineering or Computer Science and two years experience in the job offered or two years software engineer or programmer analyst experience. Must relocate to client sites in Houston or Dallas for periods of approximately 6-9 months. Apply at the Texas Workforce Commission, Houston, Texas, or send resume to 1117 Trinity, Room 424T, Austin, Texas 78701, JO# TX1160172. AD paid by an equal opportunity employer.

Team Leader, Technical Services sought by global communications company in Reston, VA, to work in Colorado Springs, CO, to oversee design & development of software applications for telecommunication management system in a client/server environment. The software applications incorporate Oracle relational database management system & run on Windows & Unix operating systems. Engage in system analysis & assign development tasks to team members. Engage in software design & development, modification & enhancements as needed. Complete high-level design & documentation,& final integration of new applications into telecommunication management system. Perform system backup & administration as needed & monitor system security. Supervise group members, including software engineers & business analysts. Utilize programming languages & tools as needed, including C,C++, Java, Java Server Pages, EJB, Select UML & Visual Café. Requires Master's in Information Systems, Computer Science, or related field;2 yrs experience designing & developing software applications in a client/server environment, using C,C++, Java & Select UML. $85,000/yr; M-F; 8am-5pm. Respond by resume to James Shimada, CO Dept of Labor & Employment, Tower II, #400,1515 Arapahoe St., Denver, CO 80202,& refer to Job Order No.JL1117784.

Consultant: Responsibilities are to analze, design, develop and manage the intelligent Work Station (IWS) software for the Atlas system on Tandom using object oriented methods. Responsible for software change control and the design and development of various enhancements and emergency bug fixes. Advise and guide clients in the development of their requirements and determine the best solution based on knowledge of the Atlas system and Tandom and its capabilities. Requires, Master Degree in Engineering and at least 2 years direct experience or 2 years related experience as project leader. Related experience must have included design and development on GUI platforms such as Windows NT and OS/2 in C/C++ using object oriented techniques. Salary $74,000.00 per year, 40 hrs/wk, 8am - 5pm M-F. Resume Required. Applicants must show proof of legal authority to work in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 7 North, Chicago, Illinois 60605 Attention Sheila Lindsey Reference #V-IL 24884-L. AN EMPLOYER PAID AD. NO CALLS- SEND 2 COPIES OF BOTH RESUMES & COVER LETTER.

Senior Software Engineer sought by satellite TV company in Littleton, CO to work in Englewood, CO & other unanticipated job sites in the US. At a senior level, design & develop software applications & modules for video-digital recording systems. Applications run on LINUX & Windows Operating Systems,& utilize proprietary operating systems as well. Code, test & debug software applications,& modify & enhance applications. Create designs & design documentation. Integrate modules into overall system. Utilize programming languages C & C++ in the design & development of the software applications. Requires Master's in comp. sci. or related field; working knowledge of C,C++ & developing software applications for Windows operating systems (working knowledge can be gained through employment experience or in an academic program). 8am-5pm, M-F; $66,100/yr. (6 opgs.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II,#400,1515 Arapahoe, Denver, CO 80202,& refer to Job Order Number JL1117745.

SYSTEMS ANALYST (Houston, Texas) - Analyze user requirements, procedures, and problems to automate processing or to improve business decision support. Design data Input, output formats. Design Data Models. Design database replication and database applications using languages such as Oracle, Sybase and SqlServer. Write detailed description of user needs, program functions, and steps required to develop or modify computer program. Write various web based database applications programs using PowerBuilder, VisualBasic and ActiveX. Plan and prepare technical reports, memoranda, and instructional manuals as documentation of program development. Upgrade system and correct errors to maintain system after implementation. Reqd. BS in Comp. Sci., Comp. Eng., or Elect. Eng. plus 1 yr. exp. in job offered or rel. occup. Twenty percent of work spent traveling to client sites. 40 hrs, 8am-5pm. $55,000/yr. Apply at the Texas Workforce Commission, Houston, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701, J.O.# TQX1180151. Ad Paid By An Equal Opportunity Employer.

Systems Analyst. Analyze and define requirements for business systems within the company. Identify and recommend solutions to business problems. Contribute to the development of strategic business systems' direction for the company. Perform consulting, analysis, design, process redesign, project management and software package evaluation as required. Acquire software packages and assist in developing applications to support the business needs of the company. Keep abreast of developments within the broad area of IT and apply within the company. Requires: Bachelor's degree in Business Administration, Computer Science or related field. Undergraduate coursework must include classes in Information Systems Analysis and Advanced Computer Information Systems. EOE. 40 hrs/wk. Salary: $52,500/yr. Send resume (no calls) to: Christine Reuter, iGO Development, Inc., 9393 Gateway Dr., Reno, NV 89511.

Software Engineer (2 positions) – Research, design and develop computer software systems in conjunction with hardware product development applying principles and techniques of computer science, engineering and mathematical analysis. Requires a Bachelor Degree in Computer Science, Engineering or Mathematics and 2 yrs exp in job offered or 2 yrs exp as Programmer Analyst, Systems Analyst or Systems Engineer. Must have 1-yr exp in document imaging. 5 day, 40 hr/wk, $66,100/yr. Please mail resumes to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to order number JL1117781.

MULTIMEDIA PROGRAMMER. 40 HS/ P .WEEK WAGE $22.00/HR B.S. COMPUTER SCIENCE + 1 YEAR EXPERIENCE IN JOB OFFERED OR 1 YEAR EXP. AS WEB SITE DEVELOPER W/ VIDEO-INTERACTIVE PROGRAMMING IN PORTUGUESE LANGUAGE. FLUENT ENGLISH / PORTUGUESE (BRAZILIAN). MULTIMEDIA PROGRAMMING INSTRUCTIONAL MATERIALS FOR INTERNET DELIVERY USING UNIX/LINUX & WEB ACADEMICS FOR MARKETING PURPOSES IN BRAZIL. RESUMES TO: DEPARTAMENT OF WORKFORCE SERVICES ATTN.: PAT REDINGTON JOB ORDER # 3061210 140 EAST 300 SOUTH SALT LAKE CITY, UT 84111

Business Systems Analyst wanted by Cimnet in Downers Grove. Must have BA or equiv. in Engg. or Manuf. & 5 yrs exp. in production planning.

Respond to: HR Dept, 2651 Warrenville Road, Suite 560, Downers Grove, IL 60515.

Sr. Software Engineer wanted: responsible for design and develop new e-commerce application using the latest development tools from Microsoft and other vendors including Visual Basic, ASP, XML/XSL, COM, SQL Server, Java. Work with team members to troubleshoot issues as they arise, ensuring that all issues are resolved in a timely manner. Candidate should have 3+ yrs experience in software development & design. MS in Computer Science preferred. Fax resume to HR Dept. of Priority IT (713)461-4497.

Software Engineer for sales & service co. of precision measuring tools & instruments located in Chicago, IL to analyze user requirements, procedures & problems to automate processing & improve existing computer system using Progress 4GL Tools & GUI; 37.5 hrs/wk. Must have bach's deg in Computer Science, Electrical Engineering or Mathematics & 6 mos. in job. Contact HR Dept., Mitutoyo America Corp., 965 Corporate Blvd., Aurora, IL 60504.

Lotus Notes Program Analysts. Design, develop, Lotus Notes /Domino applications. Evaluate user request for various business management systems. Identify current operating procedures, clarify program objectives and convert project specifications. Tools, Lotus Notes, Domino, HTML, Java Script. Req. Bachelor's degree in Computer Science with 1 yr. exp. Send resume to R. Blackwell, EKI, 20 S. Clark, #620, Chicago, IL 60603

Senior Programmer Analyst wanted by Manuf. Co. in Elmhurst. Must have BA in Engg. or equiv. & 2 yrs exp. with AS/400 envir.

Respond to: HR Dept., The Chamberlain Group, 845 Larch Avenue, Elmhurst, IL 60126.

COMPUTER PROGRAMMER sought by hardware software resellers in Houston, TX. B.S. in Comp. Sc. and 6 mths. exp. required. Respond by resume to Ms. Lo, Computize, Inc. 1008 Wirt Rd., Ste #140, Houston, TX 77055.

Appl. Engr: (Software Engr.), Scottsdale, AZ. Duties: work w/clients to facilitate implementation of Buzzeo software contracts using C/C++, Java, HTML, Windows NT, 95 & 3.1, Art. Intell. (AI), rules dev/pmt, process & domain modeling. Req: BS (or foreign equiv.) Engr, Math., or related field & 2 yrs exp. in job offered or 2 yrs as Knowledge Eng. or Software Dev/pr. Exp. which may have been obtained concurrently must incl. 1 yr. exp. using Java & HTML. EOE. $85k/yr. 40 hrs/wk. Send resume (no calls) to: Jenny Haynes, H/R Admin., Buzzeo, Inc., 7320 E. Butherus Dr., Ste 202, Scottsdale AZ 85260.

Computer Systems Anal. - for automated securities trade execution/analysis in Culver City, CA; Must have bach. deg. or equiv in computer science or related field to build/implement new custom applications to link environment to QuantEX sys. & co. platform in Perl, C/C++, on UNIX. Apply to E. Boughton, ITG Inc., 44 Farnsworth Street, 9th Floor, Boston, MA 02210 ref. 39556. DL.

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Unisys Corporation - Director of Professional Services. IT & Telephony Consulting (Oakland, CA area): Build and manage large consulting organization with responsibility to develop business opportunities. Direct professional consulting staff and develop products and services for major business customers including Fortune 500 businesses. Requires at least 6 years of high level IT & Telephony consulting experience in a Director role with track record of developing business among large customers including Fortune 500 companies. Experience must include management of professional consulting staff. Successful candidate must have excellent technical background in both IT & Telephony as well as strong business development abilities. Please forward resumes to: Gary W. Greene, HR Business Partner, Unisys Corporation, 25725 Jeronimo Road, Mission Viejo, CA 92691

Data Architect/DBA Design, develop, customize and admin\r Oracle db. Plan and develop IT\sys and complex s/w apps. Exp must include data modeling and ETL. Must work in a team using dev and proj mgmt tools. Cands must be Oracle Certified & have proficiency with current releases and tools: Oracle Developer, Designer, Discoverer, Server & Enterprise Mgr., JDBC & ODBC. Resp includes: dw framework design log & phys db design (OLTP and DSS), db & tools installation and customization, db & app tuning. Manage and monitor db: perl and user mgmt, review and optimize stored procs and triggers, backup and recovery procs inc disaster recovery, config Oracle Web Servers & db security mtce. SQL and PL/SQL, UNIX (Solaris, Linux, HP-UX, AIX), Shell Scripts, Win NT/2000. MS in CS or App. Math + min. 3 years exp. Send 2 copies of resume to: GRT Corp, 777 Summer St., Stamford, CT 06901 EOE/M/F/D/V

ENGINEERING

Interwoven has the following positions available:

* Software Engineers- (Austin, TX; Sunnyvale, Mt. View, San Francisco, CA)
* Technical Consultants- (Alpharetta, GA; Boston, MA; Sunnyvale, Mt. View, San Francisco, CA)
* Sr. Server Engineer- (Sunnyvale, Mt. View, San Francisco, CA)
* Technical Support Engineer- (Sunnyvale, Mt. View, San Francisco, CA)
* Product Manager- (Sunnyvale, Mt. View, San Francisco, CA)
* Software QA Engineer- (Sunnyvale, Mt. View, San Francisco, CA)
* Sales Engineer- (Chicago, IL)

Resumes to: Interwoven, Attn: S. Leonard, 1195 W. Fremont Ave., Sunnyvale, CA 94087; Fax: 408-530-7104; E-mail: sleonard@interwoven.com. EOE.

Full-time position available for Technical Sales Engineer-International Sales Team Leader. Responsible for sales team for all international direct sales. Provide pre-sales engineering support to prospects, supervise junior technical support personnel responsible for international support, provide engineering support to company's international reseller channel, conduct customer training in assigned international sales area, attend trade shows and product demonstrations. Bachelor of Science in Computer Science or equivalent; 2 years experience in the job offered or 2 years experience in digital imaging programming and demonstrated proficiency in Window programming requirements/compilers and environments. Required computer languages/applications knowledge: Visual Basic, Visual C++, Delphi and C programming. $43,000.00/yr.8:00 am to 5:00 pm, M-F. Send cover letter and resume to Jordan Shields, VP and Legal Counsel, LEAD Technologies, Inc., 900 Baxter St., Charlotte, NC 28204.

Software Engineer (Atlanta, GA): Responsible for full life cycle software development, including research, analysis, design, code, testing, conversion & production. Will provide support of local, network & internet related computer software systems in conjunction with hardware product development utilizing C++, Java or Forte development language in a Windows NT environment. Will analyze, design, program, debug & modify local, network or internet-related computer programs for commercial or end-user applications for use by banking & financial services institutions. Will liaise with hardware engineers & other engineering staff to evaluate interface between hardware & software, & operating & performance requirements for overall system. Must have Bachelors degree in Computer Science, Engineering or scientific related field, or foreign degree equivalent & 2 yrs experience in job offered (Software Engineer) or 2 yrs experience in a position involving full life cycle software development (analysis, design, code, testing, conversion & production). Mentioned experience may have been gained concurrently & must include (i) 2 yrs exp. in C++, Java or Forte development language; and (ii) 2 yrs exp. on Windows NT development platform. Must have legal authority to work in the U.S. Send resume to: N. Bression-Page (Ref: SEAti) 3390 Peachtree Road, N.E., Ste. 1700, Atlanta, GA 30326.

SOFTWARE ENGINEERS needed for software development and systems design using Visual C++, Microsoft Foundation Classes (MFC) and C/C++ on UNIX and Windows NT platforms. Master's required in Math, Computers, Engineering or any other related field of study, plus 1 yr of exp. Must have proof of legal authority to work in the U.S.

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SOFTWARE APPLICATIONS DEVELOPER. Functional and Graphic Design associated with the development, technical programming (ASP, SQL Server), hosting (Microsoft IIS), dynamic and e-commerce websites; Interaction with peer developers, supervisors and customers; Develop specialized software applications designed to satisfy business requirements of customers; and, must be willing to relocation within the U.S. on a project-by project basis. Must have six (6) years' work experience in the job offered, or six (6) years experience as a Software Engineer, Systems Engineer, IT Supervisor, or any suitable combination of education, training, and experience, pr related. Hrs: 9a-6p, M-F. Apply to Blackstone & Cullen, Inc., Attn: A. Lee Blackstone, Pres/CEO, and reference ad #LV0001, 2000 RiverEdge Parkway, Suite 750, Atlanta, GA 30328.

Senior Engineer to play a critical role in technology implementation for eBusiness related projects. Oversee engineering team to deliver an aspect of a project architecture, creating prototypes, specifying functionality, integrating systems and implementing packages. Interface with client to elicit requirements for a segment of the project. Lead system development in a multi-disciplinary team environment. Requires Bachelor's degree in Computer Science, Engineering, IS, Math or Physics and one (1) year experience in job offered or one (1) year experience in development of client/server or web technologies. Candidate must also possess working knowledge of software design using Java, C++ or SQL. Salary $70,000/yr.; Mon-Fri, 9:00AM-5:00PM. Submit two (2) copies of resume to Colorado Dept of Labor and Employment, Employment Programs. Attn: Jim Shimada, 1515 Arapahoe Street, Tower 2, Suite 400, Denver, CO 80202-2117. Refer to order number JL 1117857 EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Computer Support Specialist - implement & maintain networked computer system. Manage database, develop customized reports thru integrated info system for process'g inventory levels, purchas'g, sales & invoic'g. Train system users. 40 hrs wk, 8-5, $34,950 yr. 2 yrs coll (major in computer science). 2 yrs exp in job offered or 2 yrs exp in computer & info systems instruction. Fax resume to DAU (305)673-4111, Attn: Mr. Colmenares

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EDP Systems Analyst

Requires a B.S. or B.A. in Computer Science or Management Information Systems with 5+ years experience developing and implementing computer systems and procedures within an information technology environment as well as knowledge of SUN hardware platforms. Position is responsible for maintaining a UNIX environment and performing Solaris System Administrator functions supporting 24x7 SAP R/3 environment; setting up and managing NIS, DNS, SNMP, NFS, Automounter, patch installation, configuration, system test, documentation, troubleshooting, and installation of SUN OS and Solaris systems, and application software; performing hardware configuration, testing, and documentation of E10000 Enterprise servers and other middle range servers to support production SAP/R3 environment.

EDP Systems Analyst

Requires a B.S. or B.A. in Computer Science or Management Information Systems with 10+ years experience in computer systems with Enterprise 10000 and System Service Process (SSP) Administration, including performing sizing and configuration of domains. Must possess operation and maintenance skills on non E-1000 servers such as E-4500 and E-450 servers, expertise with SUN HA Cluster set-up/troubleshooting, Solaris UNIX skills including performance, tuning and networking, and Veritas Volume Manager. Experience in ATM and Gigabit Ethernet network interfaces with knowledge of network topology and protocol such as ATM, Ethernet, TCP/IP, Bourne and C shell scripts writing, and BMC monitoring tool is essential as well as knowledge of system security with background of UNIX scheduling product and its interface with mainframe scheduling.

EDP Applications/ Systems Specialist

Requires a B.S. in Computer Science or Engineering with 12+ years experience in IT applications, systems analysis and programming to include 5 years in a specialized field such as GIS/Mapping, CAD/CAE Engineering, Document Management and Web development. In addition, candidates must possess expertise in development and implementation of enterprise solutions relating to databases, networking, operating systems, and system security. The ability to sell ideas/solutions to senior levels of management in the development of business justification is desired.

EDP GIS Systems Analyst

Requires a B.S. or M.S. in GIS/Computer Science/Information Systems or a related discipline with 10 years of experience designing and producing maps and other graphic products using a geographic information system and other computer programs. This position programs specific applications and tools through Windows based Object Oriented and Web based languages for use in entry of geographic information, data analysis, map production, report production, and enhancing existing programs to meet current requirements; creates and maintains databases; captures data in different formats using electronic data recorders, global positioning system equipment, digitizer, and other means; analyzes GIS needs of user departments and implements GIS programs, databases, maps, and related products.

EDP Applications/Systems Specialist

Requires a B.S. in Computer Science, Information Systems or Engineering with 12 years of IT experience including at least 8 years specializing in structured analysis, design tools and techniques. In addition, candidates must have: 3 years experience designing client/server systems, distributed systems and system integration with a strong background in a variety of operating systems such as Windows NT, UNIX, and IBM mainframe; 3 years experience developing client/server applications using Power Builder and PFC; 2 years experience developing WEB applications using Microsoft technology including Microsoft Active Server Pages (ASP), Microsoft Transaction Server (MTS), Active-X Components and Seagate Crystal reports. A background with relational database management systems, preferably Oracle, is required. Exceptional written/verbal communications skills and the ability to work independently across multiple and geographically distributed organizations are preferred. Programming with C++, JAVA, Internet Information Server, website development, HTML, XML a plus.

EDP Applications/ Systems Specialist

Requires a B.S. in Computer Science, Engineering, or Business Administration with 12 years experience managing a large help desk or awareness team to ensure the maximum utilization of computer applications, software solutions, and other Information Technology services by user organizations. Technical knowledge of Internet, Intranet, Windows, UNIX, software, hardware and network architecture is preferred.

For a detailed description of the above positions, please refer to our website **www.jobsataramco.com**. For consideration, please send a resume to **Aramco Services Company**, reference code 065-COMPW, in one of the following ways: E-mail: resumes@aramco.com (please cut and paste rather than send an attachment); Fax: (713) 432-4600; Mail P.O. Box 4530, Houston, TX 77210-4530.

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RDBMS: Informix, Oracle, FoxPro, Sybase, SQL Server, Progress; **Oracle RDBMS:** Designer 2000, Developer 2000, Oracle RDBMS, SQL*Plus, Pro*C, PL/SQL, SQL*Forms, SQL*Reports, SQL*Loader, Oracle Forms, Oracle Reports, SQL*Menu, SQL*DBA, SQL*Net;

GUI: Windows 95/98/00, Windows NT, Visual C, Visual C++, C, C++, Visual Basic, PowerBuilder, MFC, Crystal Reports, COM/DCOM, CORBA;

Mainframe: IBM3090, IBM ES900, MVS, IMS, CL/400, CICS, TSO, VSAM, COBOL, JCL, AS/400, DB2, VAX/VMS, MVS;

ERP: PeopleSoft, SAP, Baan or Oracle Applications/Financials/ Manufacturing/HR;

Internet Applications: ASP, HTML, Java Script, Java, Coldfusion, Broadvision, ATG Dynamo, Netdynamics, Websphere, Java Beans, Front page, CGI, Pearl, MTS, IIS;

CRM: Siebel, Clarify, Oracle CRM, SAP CRM;

DBA: Oracle, Sybase, Informix, SQL Server;

Unix/NT Administrators: Sun Solaris, IBM RS/6000, DG-Digital, SCO Unix, Windows NT Administrators, HP9000, HP UX, IBM AIX, IRIX.

SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software systems using PowerBuilder, C, Visual C++, Oracle, SQL and Sybase under DOS, UNIX and Windows NT operating systems. Require: Bachelor's degree in Computer Science, an Engineering discipline, or a closely related field with five years of progressively responsible experience in the job offered. Competitive salary offered. Apply by resume to:Jonathan Klorfein, Director of Client Services, Labor Finders International, Inc., 3910 RCA Blvd., Suite 1001, Palm Beach Gardens, FL 33410; Attn: Job SG.

Computer Consultant - Analyze customer IT needs for hardware & software purchases, provid'g advice in English & to export customers in Latin America (in Spain) integrated solutions in wireline, wireless and VPN's us'g various op'g systems, printing, SCSI devices, back up systems, servers, web servers, exchange servers, remote access servers, SQL data bases and TCP/IP. 35 hrs wk, 9-5, M-F, $25.50 hr, 2 yrs coll (major in Computer Science or Electrical Engineering) + 2 yrs exp in job offered req'd. Fax resume to Induexco (305) 477-4655, Attn: Mr. Lenis.

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Software Engineer
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Computer- Opportunities are available for consultants nationwide in the following areas: Oracle, SAP, Peoplesoft, electronic commerce, object oriented technologies, & legacy software conversion. Apply to Ref# 606, S. Rubenstein, Ernst & Young, 125 Chubb Ave, Lyndhurst, NJ 07071.

Programmer Analyst: IT professional with knowledge of network/systems architecture, integration, design, and deployment to formulate, define, design, modify and maintain specifications for complex network architectures using Windows NT and UNIX. Must have skill with OO, client-server, n-tier environments and RDBMS (Oracle, Sybase, SQL, Mums); and with Java and Web Architecture. Multiple openings. B.S. in comp. science or equiv. + 2 yrs. exp. as systems analyst or software engineer; or M.S. in comp. science or equiv. + 1 yr. exp. 40 hrs/wk., 9:00 a.m.– 5:00 p.m. $71,000/yr. Send resume to: Ref. APSE3, Widezone Int'l Co., Ltd., 6340 N. Leavitt St., Chicago, IL 60659. Must have legal authority to work permanently in U.S.

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Exchanges

made it," said Peter Solvik, CIO at Cisco Systems Inc. in San Jose.

Yet GM CEO G. Richard Wagoner vowed his traditionally conservative corporation would look to migrate much of its supply-chain procurement toward Southfield, Mich.-based online exchange Covisint LLC, which GM formed with Ford Motor Co. and Daimler-Chrysler AG.

CAMINITI: Cordiem "wasn't a small investment" for Delta.

"We did roar into this Covisint, and it is the right thing to do. . . . We're not turning back," Wagoner promised while speaking at the E-Business Battle Royale conference in New York. He went on to promise that GM would continue to migrate its purchases to Covisint.

Wagoner acknowledged that having to reach agreement with such large competitors on how the marketplace would operate delayed its time to market, but he said he firmly believes that Covisint will capture a significant piece of the more than $300 billion in purchases made by its current automotive members.

Still Hopeful

The buzz is similar at public marketplace Cordiem LLC, which was established by the major airlines.

"We've already financially committed to doing this, and it wasn't a small investment," said Vince Caminiti, executive vice president for e-commerce at Atlanta-based Delta. "It's going to take a while, about three years possibly, for it to gain its place in the market, but we're in it for the long haul."

Caminiti said he believes the investment will pay dividends over time. "We are very bullish to the tune of $40 million, $50 million a year it will be saving us in a few years," he said.

Yet analysts aren't as bullish as they were a year ago. Gartner Inc. last month reduced its 2004 estimates for online business-to-business commerce from $7.3 trillion to $6 trillion.

MOREONLINE
For forums and complete e-commerce news, visit our E-Commerce Community at **www.computerworld.com/b2b**

Chris Silva, an analyst at market research firm IDC in Framingham, Mass., compared the current slowdown in IT spending to "nuclear winter" and predicted that only the strongest business-to-business vendors will be able to survive if the situation doesn't improve quickly.

"In some cases, customers are making smaller initial investments in technology projects and extending those projects over a longer period of time," said Mark Hoffman, CEO and chairman of Commerce One Inc. in Pleasanton, Calif., in a webcast discussing lowered earnings. "In general, customers have become increasingly cautious in light of current economic conditions and more deliberative in their strategic and competitive evaluations of information technology."

One fan of some of the current business-to-business software offerings is FedEx Corp. CIO Robert Carter. While he said his company is still hesitant to trade inside the large public exchanges, he noted that using Ariba's procurement software has proved valuable to FedEx for more limited applications. Specifically, FedEx employees have been told to purchase PC products and supplies through Ariba's catalog, which has created savings in equipment costs.

Reporter Todd Weiss contributed to this story.

B2B Firms Cite Weak Market

A number of software vendors in the business-to-business space cited tough market conditions last week, including the following:

Commerce One said an expected first-quarter loss will likely be three times larger than previously predicted because of a shortfall in revenue. The company said it expects to lose about $21 million on revenue of $170 million in the first quarter.

Ariba cited disappointing revenue, a plan to cut about one-third of its 2,100 employees and the cancellation of a merger deal with San Jose-based Agile Software Corp.

i2 Technologies Inc. in Dallas disclosed that it may lay off up to 10% of its 6,100-plus employees because of lower-than-expected financial results in the first quarter.

BroadVision Inc. in Redwood City, Calif., said it plans to cut 325 employees – or about 15% of its workforce – after being affected by delays in purchases by users during the just-finished quarter.

– Todd Weiss

EBay Amends Its Privacy Policy

Would allow the transfer of customer information if merger or acquisition occurs

BY JENNIFER DiSABATINO

ONLINE auctioneer eBay Inc. has revised its privacy policy to allow the company to share customer information in the event that eBay or one of its subsidiaries merges with or is acquired by another company.

"It is possible that eBay, its subsidiaries, its joint ventures or any combination of such could merge with or be acquired by another business entity. Should such a combination occur, you should expect that eBay would share some or all of your information in order to continue to provide the service. You will receive notice of such event," the privacy policy now reads.

The revision, posted a week ago, would explicitly allow San Jose-based eBay to transfer that information and avoid the legal hassle that now-defunct Toysmart.com Inc. encountered when it tried to sell its customer list as an asset during bankruptcy proceedings last summer.

Two months ago, a federal judge ruled in favor of a deal in which Walt Disney Internet Group, a subsidiary of The Walt Disney Co., would pay Toysmart $50,000 to destroy its customer list. Burbank, Calif.-based Disney owned 60% of the bankrupt company.

AT A GLANCE

Policy Change

EBay covers itself by changing its privacy policy.

- In the event of a merger or acquisition, eBay will share its customer information with the other company in the deal.
- Truste will oversee the transfer of information, including notification of the transfer via e-mail to all customers whose information eBay would transfer.
- Each customer has the right not to have his information transferred.

Both eBay and Toysmart had agreed not to give customer information to third parties in exchange for the right to post the Truste privacy symbol on their sites.

Waltham, Mass.-based Toysmart's subsequent attempt to sell its list angered privacy groups, including San Jose-based Truste, and attracted the attention of the Federal Trade Commission (FTC). Both Truste and the FTC sought to block the sale.

EBay, however, has Truste's support. "EBay actually checked with us before they changed their privacy policy, and we gave them the OK because they are not taking the control away from the consumer," said Dave Steer, a spokesman for Truste.

Before changing the policy, eBay agreed to have Truste oversee the transfer of customer information in the event of an acquisition or merger.

Steer said all customers would be notified via e-mail and could choose not to have their information transferred to a third party.

"Without choice there is no privacy," Steer said.

Truste would also suggest posting any plans to transfer information to a third party on the eBay site, for those whose e-mail addresses may have changed, said Steer.

"It's going to be difficult. There are going to be cases that always fall outside of enforcement [of the privacy protection agreement between eBay and Truste]," Steer said.

The U.S. House of Representatives and the Senate each recently passed similar privacy protections, and President Bush is expected to sign a final bill soon.

The legislation forbids companies from selling customers' personal information at the time of bankruptcy if they had previously promised they wouldn't do so.

However, a sale or lease of the data can go through if it's consistent with pre-existing company policy, or if the move has come under court consideration.

MOREONLINE
For *Computerworld*'s complete coverage of privacy issues, click to **www.computerworld.com/privacy**

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FRANK HAYES/FRANKLY SPEAKING

Sharing IT's Tools

DWIGHT HORCH WAS TELLING ME about his project management tool. "What's happening is that it's being used for projects outside information systems and technology," he said. "They're using it in marketing, research and program direction."

Imagine that: Users swiping a tool from the IT people.

If that sounds weird to you, well, it just points up how far we really are from all that stuff we spout about the importance of aligning IT with the needs of the business. Align IT with the business? Heck we don't even want users to borrow our tools.

In case you're wondering, Horch is executive director for IT at Educational Testing Service (ETS) in Princeton, N.J. (Yes, they're the SAT people.) The tool he likes so much is Project Office from Pacific Edge Software Inc. in Bellevue, Wash. He likes it because it fosters collaboration, because users can do useful things with it after just a few hours of training and because the system kicks out actionable management information early in the project process.

But this column isn't about Project Office. It's about what happened after Horch brought it into ETS to get a handle on his hundreds of IT projects.

People in other departments — businesspeople, not IT people — started using it. They used it because they were involved in those IT projects. They found it useful. They liked it.

So they adopted it for their own projects.

Wait wait, you're thinking, we don't *do* that. We don't let users fool around with IT shop tools. We keep that stuff safely away from them, so they don't get into trouble we'll have to bail them out of.

We want them to handle that business of building bulldozers or selling shoes or making microwaves. They should stick to the automotive or grocery or insurance business, whatever it is our company does. And they should leave IT's tools alone.

But we've got it wrong. Good things happen — the best things, in fact — when users start borrowing our tools. That means they're working with us closely enough that they know our tools. And if they know our tools, they've started to understand what we do and begun forcing us to understand what *they* do.

We need that. In IT shops, it's so easy to slip into that technology cocoon: heads down, turning requirements into code, specs into systems.

No, it's not as bad as it used to be when users tossed requirements over the wall and, two years later, IT threw back a system. Today, we meet with users and develop use cases and give them a prototype or two before we deliver the product.

When users swipe IT's tools, we're probably on the right track.

But too many of us are still focused completely on bits and wires, speeds and feeds — and never on understanding the business of cars or shoes or insurance that the rest of the company is doing.

And without that understanding, we'll never really get it right. We'll never create e-commerce applications that actually sell the goods, or implement supply-chain management that makes the assembly lines and warehouses perform better. We'll never build business systems that really do what the business needs.

Users getting their fingerprints all over IT's tools doesn't guarantee that *we're* making the connection, of course. But if they're getting in that close, it's likely we're on the right track.

Think of it as a new yardstick for how well we're doing our job of delivering IT for the business. When users are satisfied with the systems we deliver, that's good. When they participate in developing those systems, that's better.

But when they start to borrow our tools — *then* we'll know we're getting it right. ◗

Hayes, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

THE IRS AUDITS this pilot fish's company, and management decides to give the auditors workspace in the computer room. One afternoon, everyone's midrange applications freeze up. Fish checks it out and everything looks fine, but he can't see the server that links the midrange box to the outside world – it's under a table at which an IRS auditor is on the phone. Not wanting an audit of his own, fish waits patiently. "When she finally got off the phone, I discovered the server's power was off," he says. Diagnosis: The auditor accidentally kicked the power switch, cutting off headquarters and six remote sites.

JUST A HUNCH Network admin pilot fish gets an e-mail message from one user: "Early on, it seems today will be a bad computer day. Could you check out my computer for unexpected crashes and printing errors throughout the day?" Says puzzled fish, "Guess I should just drop in unexpectedly?"

VERMIN IS VERMIN Paper company hires a new boss with lots of experience, but none of it is with PCs. At a staff meeting early on, "he mentions his reservations about having a 'roach' on his desk," pilot fish reports. Baffled fish and his colleagues discount the possibility he means bugs or drugs, and finally realize he's renamed that pest next to his keyboard – the mouse.

DUMB IS AS DUMB DOES Small manufacturing company decides to upgrade its order-entry system. "Since management believes its own tech employees are too dumb to do a decent job, the task is contracted out," says an irritated pilot fish. Three years later, the $2 million state-of-the-art system is ready to go and only $5 million over budget. And the company's customers now do their ordering through brokers, so the system handles at most about 400 transactions per day. "With that traffic," fish estimates, "two fast clerks could have handled it on PCs."

FOR FOUR MONTHS after a new application debuts in his department, this manager complains constantly to the IT director: the system sucks, it's slow, it's worthless. Finally, in month five, help desk pilot fish gets a call from the grouser asking what his password is for the application. Fish fumes, "Apparently, he hadn't even been in it yet!"

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The 5th Wave

"I'm not sure you're taking this exam seriously enough. When asked to give a description of a 'Repeater', you wrote the recipe for a large bean burrito."

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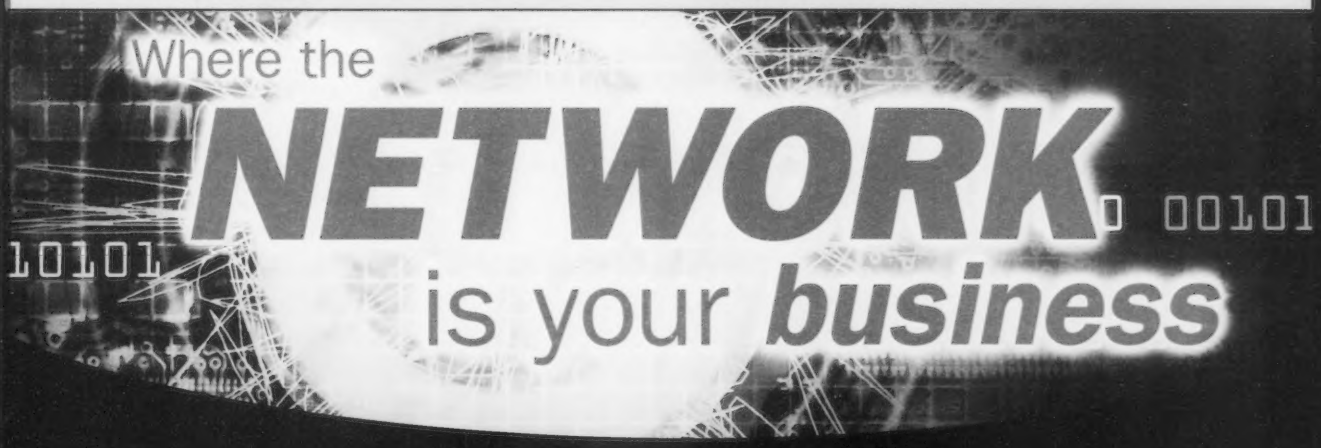

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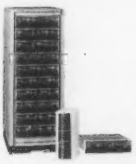

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